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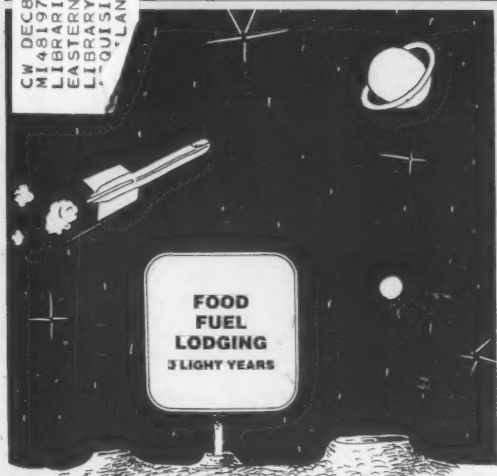
THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

Weekly Newspaper Second-class postage paid at Framingham, Mass. and additional mailing offices. Postmaster: Please send address changes to Computerworld, Inc., 10000 Wilshire Blvd., Suite 1000, Los Angeles, CA 90024.

/year

February 15, 1982

Vol. XVI, No. 7



Model Predicts Space Colonies Within Three Generations

By Tom Henkel

CW Staff

LOS ALAMOS, N.M. — Man may be living in space colonies within three generations because the Earth's population will reach its saturation point of 20 billion.

The first places colonized will be the moon and some nearby asteroids. Some of those mineral-rich asteroids may be worth \$1 trillion per kilometer; to reach one may cost only several billion dollars, an attractive investment alternative.

Those predictions may sound like the stuff of science-fiction fantasies, but they are also the results of a computer simulation developed by a researcher at the Los Alamos National Laboratory's Earth and Space Division. Using a Control Data Corp. Cyber 64 and an older CDC 7600 vector processor, Eric Jones has compiled data on human migration paths going back as far as 1500 B.C.

(Continued on Page 4)

No Need To Replace CPU by '90?

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — By the end of this decade, advances in modular computer architecture will end forever the need to replace obsolete hardware regularly, according to a study recently released by the National Bureau of Standards.

While technology developed during the 1985-1995 decade will greatly increase the utility, flexibility and reliability of general-purpose systems, the study prepared by Arthur D. Little, Inc. (ADL) predicts that there will be no real decrease in data processing costs because of growing software and personnel expenses and because of numerous new areas for computer applications.

The general-purpose computer of the 1985-1990 period will be bus-oriented, according to the study, with two physically separate buses in most systems: a very high-speed bus for transmitting data and programs (probably a fiber-optic bundle) and a control bus for transmitting brief control messages between processors.

(Continued on Page 8)

IBM Expands Series/1 With Mid-Range 4954

By Tom Henkel

CW Staff

RYE, N.Y. — IBM expanded its line of Series/1 processors last week with the mid-range 4954, a system that comes in three models and features up to 256K bytes of main storage. The 4954 offers approximately twice the internal performance of the smaller 4952 processor at about a 30% higher purchase price.

IBM also announced remote job entry software for the new processors.

The 4954 processor is available with a minimum of 64K bytes of main storage which can be expanded in 64K-byte increments to the 256K-byte maximum, IBM said. The three models comprising the 4954 line include:

- The low-end 4954A, a half-rack system with four I/O feature slots.
- The mid-range 4954B, a full-rack system with 13 I/O slots.
- The top-of-the-line 4954C, a full-rack processor with an integrated 1.2M-byte diskette unit and three I/O slots. A second 1.2M-byte integrated diskette is optional.

The 4954 processors employ an 8-bit address space and offer software compatibility with 4955 processors. They are available with a floating-point option.

Peripherals compatible with the smaller 4952 and larger 4955 processors can be used with the 4954 processor family, an IBM spokesman noted.

All three 4954 models are scheduled for March availability. A 64K-byte 4954A costs \$8,810, a 64K-byte 4954B costs \$10,105 and the

4954C (also 64K bytes) costs \$12,845.

The full-rack 4954B with 128K bytes of main storage costs \$11,200. A similarly configured 4955 processor costs \$13,200 and a comparable 4952 costs \$8,577.

The floating-point option for the 4954 processors costs \$635. The optional 1.2M-byte diskette for the Model C is priced at \$1,830.

The Series/1 Real Time Programming System Advanced Remote Job Entry programming package announced by IBM allows remote Series/1 users to query the host processor to get the status of a previously submitted job. The package supports Bi-synchronous and Synchronous Data Link Control communications protocols.

The package is available for a one-time charge of \$1,050 and will be available in June, according to IBM.

IBM to Cut Accrual 10% On 30 Series

By Tom Henkel

CW Staff

WHITE PLAINS, N.Y. — Effective May 1, the amount of each monthly payment that IBM users can apply toward purchase of 30 series mainframes and most related hardware will decrease by 10%, IBM announced here.

The 50% maximum purchase accrual percentage will remain in effect. However, the change in purchase option percentage means that the time required for users to reach the maximum accrual percentage will increase, a spokesman explained.

Three groups of hardware are affected by the rate change.

Items formerly allotted a 50% accrual rate that have gone to a 40% rate include all 3033 processors, the 3036 console, the 3037 power and coolant distribution unit, the 3038 multiprocessor communications unit, the 3042 attached processor, 3081 processors, the 3082 processor controller, the 3087 coolant distribution unit, the 3089

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Cocaine, \$25 Million Seized

Data Base Helps Crack Drug Rings

By Jim Bartimo

CW Staff

WASHINGTON, D.C. — Fifty pounds of cocaine and \$25 million have been seized and 15 indictments involving 64 people have been handed down in a narcotics crackdown that has traced drug money with the help of a computer data base since May 1980.

An additional \$112 million in unpaid taxes and property valued at \$4 million have also been seized through "Operation Greenback," an investigative effort that concentrates on money instead of drugs, according to U.S. Customs official William Rosenblatt, regional director for investigations in Miami.

While computers cannot find illegal narcotics, they can track the money that these drugs bring in and

money that is later laundered. The Customs Service's Currency Investigation Division, the Internal Revenue Service and the Justice Department are putting the computer to work at tracking large, unexplainable sums of money, Rosenblatt said.

Under Operation Greenback, Customs and the IRS are tracing sums of money to the kingpins of the illegal narcotics game. These people do not actually handle the drugs, Rosenblatt said, but they realize profits from drug sales.

When a Federal Reserve Bank cash-flow analysis found Southern Florida financial institutions to be top-heavy by \$4.8 billion, officials knew that more money was passing through the state's banks than there were businesses to produce the

capital. The surplus had been previously undetected because of area financial institutions' failure to report large deposits and withdrawals to the IRS, Rosenblatt said.

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Firms Don't Spend Enough On DP, Consultant Argues

By Jeffrey Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Many computing department managers still find themselves unable to convince their bosses of the critical need to boost their company's investment in new equipment and software.

The result is that, despite ever-increasing information systems budgets, many busi-

nesses continue to spend much less for computing than they should, according to Arthur D. Little, Inc. (ADL) senior consultant Martin Buss.

Underinvestment in DP resources poses a serious problem for U.S. corporations and at least partly explains why many of those organizations are becoming increasingly

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COMPUTERWORLD

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Second-class postage paid at Framingham, Mass., and additional mailing offices. Postmaster: Computerworld (ISSN: 0010-4841) is published weekly, except semiweekly the third week in March, the first week in September and a single combined issue the last week in December and the first week in January by CW Communications, Inc., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

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\$1.25 a copy: U.S. — \$36 a year; Canada, Central & So. America — \$65 a year; Europe and Near East — \$125 a year; other foreign — \$175 a year (airmail service). Four weeks notice is required for change of address. Please allow six weeks for new subscription service to begin.

Computerworld can be purchased on 35 mm microfilm through University Microfilms Int., Periodical Entry Dept., 300 Zeeb Rd., Ann Arbor, Mich. 48106. Phone: (313) 761-4700. Computerworld is indexed: write to Circulation Dept. for subscription information.



POSTMASTER: Send Form 3579 (Change of Address) to Computerworld, Circulation Dept., Box 880, 375 Cochituate Road, Framingham, Mass. 01701.

Justice Department Issues Statement On Impact of U.S. vs. AT&T Settlement

By Phil Hirsch

CW Washington Bureau
WASHINGTON, D.C. — AT&T's divestiture of its local operating companies removes "the structural problems that have given rise to the controversies between the U.S. and AT&T over the last three decades," the Justice Department said last week in a statement describing the competitive impact of the settlement negotiated last month in the U.S. vs. AT&T antitrust case.

For the computer industry, possibly the most significant part of the impact statement is its assertion that each Bell operating company, after divestiture, will be able to do packet switching inside its local exchange network, but cannot offer its customers "a service that provides voice or data storage as part of the service offering."

This has been interpreted as a refer-

ence to Custom Calling II, the offering that AT&T tried but failed to persuade the Federal Communications Commission to accept as an operating company offering last year.

One fear widely expressed on Capitol Hill since the settlement was announced Jan. 8 is that it will generate big increases in local telephone rates. The statement says the Justice Department will "consider disapproving any reorganization plan under which particular divested [Bell operating companies] are confined to a service area so limited as to bring into question their financial or technical viability."

The reorganization plan is a detailed blueprint for restructuring the Bell system according to the principles stated in last month's settlement agreement.

AT&T must draft the plan within six months after Judge Harold H. Greene, who has been presiding over the antitrust trial, accepts the proposed settlement.

Last week's competitive statement also said that:

• AT&T could not "participate in or contribute to" the centralized organization which the settlement agreement proposes to provide the Bell operating companies with those services that can most efficiently be offered on a centralized basis. "The department will closely examine whether centralization would interfere with achievement of the [settlement agreement's] nondiscrimination and other requirements."

The Justice Department quickly added, however, that this organiza-

tion becomes the group which coordinates national defense and emergency preparedness communication needs; its membership would include "all carriers."

• "The functions to remain with AT&T after divestiture would include those assets and contracts relating to the solicitation of Yellow Pages advertising and for its printing and delivery. Each Bell operating company, however, retains the rights inherent in its files of telephone subscribers. . . . Hence, each divested Bell operating company effectively will have the ability to sell the Yellow Pages franchise to the highest bidder."

• It is "expected" that the exchange area for each Bell operating company "will be large enough to comprehend contiguous areas . . . but not so large as to defeat the intent of the [settlement] to separate . . . intercity services from . . . local exchange services. The Justice Department will, however, give great weight to existing arrangements" where an exchange area includes more than one standard metropolitan statistical area or crosses state boundaries.

• "Because the removal of AT&T's incentives and ability to monopolize exchange services will accelerate the emergence of competition in interexchange services, the prospects for the deregulation of that market will be enhanced. With the dissipation of AT&T's market power in an increasing number of interexchange markets, the need for regulatory intervention will erode sharply in coming years."

Correction

In "A New Chapter in His Career" [CW, Feb. 8], Virgil Pittman identified himself as the vice-president of systems and data processing at Nationwide Insurance Co. Pittman is, in fact, the vice-president of home office data processing.

Pittman reports to Brad Kirk, the vice-president of systems and data processing and Nationwide's highest ranking information systems officer. Kirk continues in that position and did not retire from the company on Dec. 31, as Computerworld was told.

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IBM Contender Enters Relational Sweepstakes

By Rita Shoor
CW Staff

WHITE PLAINS, N.Y. — IBM introduced a relational data management system last week as its first official entry in what may be the 1981 relational sweepstakes.

The Structured Query Language/Data System (SQL/DS) supports application areas where interactive query, report writing and end-user data base facilities are desired.

Although SQL/DS was designed specifically to extend the DOS/VSE system environment, IBM's official statement of direction made it very clear that MVS and VM installations can look forward to a similar offering for those operating systems. "It is IBM's direction that any future analogous offerings in the MVS [CICS, IMS, TSO] and VM [CMS] environments will address similar customer data requirements," the vendor said.

SQL/DS supports a relational data model, the vendor emphasized, with data being defined in tabular form and accessed through operations on those tables. The two-dimensional tables, which are the structural part of the relational model, would normally have a fixed number of columns and a variable number of unnumbered rows, according to IBM.

The informational view presented to a user of the logical tables need not conform to the actual-physical representation of the stored tables. Views may combine data from several stored tables or other views and may create subset tables by rows and/or columns. SQL makes it unnecessary of the

And, since SQL makes it unnecessary to know the physical structure of the data base, the relational model can effectively support a "broad range of user data requirements," IBM claimed.

SQL, the product's high-level access language, supports data definition, access, manipulation and control operations and is available through a CICS/OS/VS transaction or equivalent, a batch utility and application programs, a spokesman explained.

By entering various SQL commands through a terminal, users can report-
the query operations without

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Supervised Case Until 1977

Ex-Justice Official Assails U.S. vs. IBM Dismissal

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The former supervisor of the Justice Department's antitrust case against IBM said recently the decision to drop the suit was based on a fundamental misunderstanding of the nature of the government's complaint against the company.

"It is my firm belief . . . this case is not without merit," Lewis Bernstein said, who, until 1977, was chief of the Antitrust Department's Special Litigation Section. He was referring to Antitrust Division Chief William F. Baxter's decision last month to dismiss the suit because, according to Baxter, it had little or no legal justification.

Bernstein said in a Feb. 4 statement to the House of Representatives Judiciary Subcommittee on Monopolies and Commercial Law that the case had been brought in accordance with established Supreme Court precedent for antitrust actions and the government was perfectly capable of proving its contentions against IBM.

At the very least, he said, Baxter should not have dropped the case, but should have asked the court to dismiss it based on some supporting legal analysis.

His concern for public participation in the decision-making process was shared by the subcommittee, which has pressured Baxter for information on how he arrived at his decision to drop the suit (see related story).

Bernstein, the last witness of the subcommittee's hearings into Justice's decision to drop the suit, was the only one to dispute strongly Baxter's definition of the case and his

Baxter Kept No Memos on Decision

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — Assistant Attorney General William F. Baxter told a House of Representatives subcommittee recently that it never occurred to him to keep any records of the deliberations leading to his decision to drop the government's antitrust suit against IBM.

In a Jan. 28 hearing, Rep. Peter W. Rodino Jr. (D-N.J.), chairman of the Monopolies and Commercial Law Subcommittee, asked Baxter if he had kept any minutes, memos or notes on meetings he held with IBM and the Justice Department trial staff during his consideration of the case.

Rodino's panel is at this point more interested in finding ways to ensure there is never a repeat of the long and costly IBM litigation

than in second-guessing Baxter's decision. For that reason, Rodino told Baxter that "unless there is some compelling reason why you can't supply this information it leaves us in what I believe to be a difficult dilemma."

Baxter replied, however, he would answer any subcommittee questions but would not release internal documents or allow interviews with his professional staff. It would be "intolerable" to "compromise the [Antitrust Division's] internal consultative process," he said.

Rodino insisted that Baxter's reticence to reveal his decision-making processes would leave the department open to doubts about the objectivity and impartiality of its decision on the IBM case. According to Baxter, however, there were no internal records kept of his

meeting with the attorneys or of his decision-making activities.

When pressed by subcommittee member Romano L. Mazzoli (D-Ky.) as to whether Baxter ever considered seeking public input in his decision, Baxter replied, "That would never have occurred to me." Exercising his authority and accepting full responsibility for the decision, he came to the conclusion that "justice required that this case be dismissed," Baxter told the subcommittee.

But, Baxter added, "I agree and agree most emphatically that the oversight role of the committee is an important one." He promised to make available as much information on the IBM decision as is possible without compromising the separation of powers between the executive and legislative branches of the government.

conclusion that it was without merit.

Bernstein noted his long association with the case, which began during the initial investigation of IBM practices in 1964 and ended in 1977, when, after retirement from the Justice Department, he was retained as special assistant to the attorney general to conduct the direct examination of the government's chief economic expert in the trial.

Discussing the department's original theory of the case, Bernstein said the government sought to prove that "IBM, having monopoly in power in

the business systems market, intended to maintain that monopoly by means that were not 'honestly industrial.'"

On the other hand, he noted, Baxter's description of the case was that the Justice Department hoped to prove "IBM maintained a monopoly position . . . through a series of illegal actions . . . against its competitors."

That description is incorrect, according to Bernstein, who said the department was trying to show that IBM "deliberately intended to, and

did, eliminate emerging competition, which was threatening the erosion of its monopoly power in the business systems market, by designing and executing business strategies, which were not illegal in and of themselves, but which did not provide users with a better price and/or a better product and/or a better service."

According to a 1966 Supreme Court ruling, Bernstein said, "monopolization consists of willfully maintaining monopoly power, however achieved, as 'distinguished from growth or development as a consequence of a superior product, business acumen or historic accident.'"

He also disputed Baxter's contention that the 13-year-old case would have dragged on for many more years, cost considerably more money and would most likely have gone against the government in the appeals court.

According to Bernstein, presiding Judge David N. Edelstein could have reached a decision by the end of this year — the bulk of the expensive litigation had already been concluded — and the Justice Department could have appealed an adverse ruling directly to the Supreme Court if it felt it had little chance of success in the appeals court.

He also disputed the previous testimony of IBM General Counsel Nicholas deB. Katzenbach and chief trial attorney Thomas D. Barr, who, in a lengthy statement to the subcommittee, blamed Antitrust Division inexperience, incompetence and poor planning for the excessive length and breadth of the trial.

Bernstein charged that "the length of this case resulted mainly from IBM's strategy to prevent a judicial determination and to continue to enjoy monopoly profits in the business systems market." The company contested the presentation of every witness and document well beyond accepted procedures for antitrust litigation, Bernstein said.

Computers Predict Migration Into Space

(Continued from Page 1)

to predict how man will populate space.

According to Jones' models, the first space mining expeditions will develop into space colonies with groups of 25 to 30 families living and working together. Despite the high-technology environment of life in space, Jones predicts that space colonies will mark a return to a more traditional life-style for humans. For most of man's existence, the scientist noted, man has lived in relatively small groups and worked for the benefit of that society. However, there will still be people who prefer to live among millions of their fellows who are concentrated in a small area, Jones said.

A space colony will be able to support as many as 10,000 people, he said. Based on that assumption, our solar system could support as many as one trillion people.

From his studies of the Polynesians, Jones has observed that man migrates outward from the original civilization at regular intervals, usually when the population reaches the saturation level.

Men had migrated to virtually all accessible portions of Earth by about 10,000 years ago. Growth studies of Pacific Ocean cultures reveal that major migrations tend to occur about

every 500 years.

Humans usually increase the population by 1% to 2% per year. When the saturation point is reached, man takes advantage of the technology of the day to find a less populated area.

Using the CDC processors, Jones has created a map of the galaxy that shows how humans are likely to migrate in the future. He said the migration will be in a three-dimensional manner, leaving a slice out of the spherical representation. That slice will be the last part colonized.

The model is based on an annual population increase of .01%. While this estimate is conservative by today's standards, Jones predicts there will be a decrease in population growth over the next few million years.

Technological Advances

Much of Jones' theory depends on technology. While admitting that there are not any concrete plans for space colonization, Jones said technological advances come rather quickly after a single breakthrough. The scientist compared the space shuttle to the invention of the airplane and noted it is very probable that a space colony will exist in the next century.

While colonies near the moon and nearby asteroids represent relatively

easy space travel, colonization of more distant places will require man to travel at speeds 7% to 10% of the speed of light.

Assuming that a vessel capable of attaining such can be built, Jones said fuel containers could be launched prior to the manned flight and retrieved by the crew. The spacecraft would be able to produce its own food, water and air, just as Earth has been able to regenerate its life-supporting elements without help from space.

How will space travel change man? While a departure from the environment that has kept man basically the same for millions of years may change us culturally, Jones maintains that the essence that defines man probably will not change very much.

In his model, the first space mining expeditions will send material back to Earth. However, subsequent ventures will become more self-sufficient.

Since many planets are not very hospitable to man's life requirements, Jones said space colonies will be built in space, with colony occupants commuting to the local planet for raw materials. As the colonies become more sophisticated, more people will remain in the colony to produce goods, according to Jones.

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ST. LOUIS MAY 10-14
MINNEAPOLIS MAY 17-21
LOS ANGELES JUNE 14-18
CHICAGO JUNE 14-18
SEATTLE JUNE 21-25
BOSTON JUNE 21-25

STRUCTURED ANALYSIS & DESIGN WORKSHOP

BIRMINGHAM APRIL 5-9
TAMPA APRIL 12-16
PORTLAND APRIL 12-16
ANCHORAGE APRIL 19-23
CHICAGO APRIL 19-23
DALLAS APRIL 26-30
CALGARY APRIL 26-30
LOUISVILLE APRIL 26-30
LONDON MAY 10-14
WINNIPEG MAY 10-14
BOSTON MAY 10-14
TORONTO MAY 17-21
WASHINGTON, DC MAY 24-28
MEXICO CITY MAY 31-04
DENVER JUNE 14-18
SALT LAKE CITY JUNE 14-18
ATLANTA JUNE 14-18
ANNAHEIM JUNE 21-25
MINNEAPOLIS JUNE 21-25
NEW YORK JUNE 21-25

INTRODUCTION TO THE TOOLS OF STRUCTURED ANALYSIS

DALLAS APRIL 15-16
CHICAGO MAY 13-14
NEW YORK JUNE 24-25

STRUCTURED DESIGN & PROGRAMMING WORKSHOP

NEW ORLEANS APRIL 12-16
SAN FRANCISCO APRIL 19-23
MEXICO CITY APRIL 19-23
ST. LOUIS APRIL 19-23
NEW YORK APRIL 26-30
ATLANTA MAY 3-7
RALEIGH MAY 3-7
ANNAHEIM MAY 10-14
WASHINGTON, DC MAY 10-14
LONDON MAY 17-21
CHICAGO MAY 17-21
SEATTLE MAY 24-28
BOSTON JUNE 14-18
PORTLAND JUNE 14-18
AMSTERDAM JUNE 21-25
TORONTO JUNE 21-25
COLUMBUS JUNE 21-25

STRUCTURED ANALYSIS & SYSTEM SPECIFICATION WORKSHOP

ATLANTA APRIL 19-23
HALIFAX APRIL 19-23
PHOENIX APRIL 19-23
COPENHAGEN APRIL 19-23
LOS ANGELES APRIL 26-30
BOSTON APRIL 26-30
QUEBEC CITY APRIL 26-30
(FRENCH)
VANCOUVER MAY 3-7
MILWAUKEE MAY 3-7
SAN FRANCISCO MAY 10-14
TORONTO MAY 10-14
CHICAGO MAY 17-21
HOUSTON MAY 17-21
WASHINGTON, DC MAY 17-21
MONTREAL JUNE 7-11
LONDON JUNE 7-11
SAN DIEGO JUNE 14-18
NEW YORK JUNE 14-18
PORTLAND JUNE 21-25
MEXICO CITY JUNE 21-25
EDMONTON JUNE 21-25

STRUCTURED ANALYSIS & SYSTEM SPECIFICATION WORKSHOP—SCIENTIFIC

CHICAGO APRIL 19-23

STRUCTURED ANALYSIS AND SYSTEM SPECIFICATION IN REAL TIME

SAN FRANCISCO MAY 17-21
CHICAGO JUNE 21-25

CONCEPTS FOR MANAGING DATA

HOUSTON APRIL 16
NEW YORK APRIL 19
ATLANTA MAY 7
TORONTO MAY 21
CHICAGO JUNE 4
DENVER JUNE 21

INFORMATION MODELING LECTURES

WASHINGTON, DC MAY 19-21

INTRODUCTION TO THE TOOLS OF STRUCTURED DESIGN

CHICAGO APRIL 29-30

ADVANCED STRUCTURED ANALYSIS

SEATTLE APRIL 26-30
WASHINGTON, DC APRIL 12-16
NEW YORK APRIL 19-23
INDIANAPOLIS MAY 3-7
CHICAGO MAY 10-14
BOSTON MAY 17-21
DALLAS MAY 17-21
CALGARY MAY 17-21
TORONTO JUNE 7-11
DENVER JUNE 14-18
SAN FRANCISCO JUNE 14-18
LOS ANGELES JUNE 21-25

STRUCTURED DESIGN WORKSHOP

PHOENIX APRIL 12-16
PHILADELPHIA APRIL 19-23
MILWAUKEE APRIL 19-23
COPENHAGEN APRIL 26-30
WINNIPEG APRIL 26-30
ATLANTA MAY 3-7
SAN FRANCISCO MAY 3-7
NEW YORK MAY 10-14
HOUSTON MAY 10-14
SAN DIEGO MAY 17-21
VANCOUVER MAY 17-21
LONDON JUNE 14-18
WASHINGTON, DC JUNE 14-18
CHICAGO JUNE 14-18
ANNAHEIM JUNE 21-25
BOSTON JUNE 21-25
MIAMI JUNE 21-25

MANAGING STRUCTURED PROJECTS

MIAMI APRIL 13-14
WASHINGTON, DC APRIL 15-16
ANAHEIM MAY 6-7
NEW YORK MAY 13-14
TORONTO MAY 20-21
SAN FRANCISCO JUNE 21-22
CHICAGO JUNE 24-25
BOSTON JUNE 28-29

DATABASE ADMINISTRATORS LECTURES

CHICAGO APRIL 20-22
NEW YORK JUNE 2-4

DATABASE ADMINISTRATORS WORKSHOP

NEW YORK APRIL 19-23
LOS ANGELES APRIL 26-30
CHICAGO MAY 3-7
WASHINGTON, DC MAY 10-14
TORONTO MAY 17-21
OTTAWA JUNE 7-11
BOSTON JUNE 14-18
HOUSTON JUNE 21-25

STRUCTURED PROGRAMMING WORKSHOP IN PASCAL

WASHINGTON, DC APRIL 19-23
ROCHESTER MAY 17-21

STRUCTURED PROGRAMMING WORKSHOP IN ADA

NEW YORK MAY 17-21
SAN FRANCISCO JUNE 14-18
LOS ANGELES JUNE 21-25

STRUCTURED ANAL. & SYST. SPEC. WKSHOP.—MICRO

CHICAGO JUNE 21-25

APPLIED ARTIFICIAL INTELLIGENCE

SAN FRANCISCO APRIL 16
LOS ANGELES APRIL 26
PORTLAND MAY 12
DALLAS MAY 14
ATLANTA MAY 17
NEW YORK JUNE 14
BOSTON JUNE 15
BALTIMORE JUNE 17

FUTURE TRENDS IN SOFTWARE DEVELOPMENT

NEW YORK APRIL 16
WASHINGTON, DC MAY 6
BOSTON MAY 7

PROJECT AND TEAM MANAGEMENT WORKSHOP

LOS ANGELES APRIL 31-02
SAN FRANCISCO APRIL 5-7
CHICAGO JUNE 2-4
NEW YORK JUNE 9-11
HOUSTON JUNE 16-18

QUALITY ASSESSMENT OF ANALYSIS AND DESIGN DOCUMENTS

NEW YORK APRIL 21-22
SAN FRANCISCO MAY 19-20
CHICAGO JUNE 21-22

INTERVIEWING SKILLS WORKSHOP

CHICAGO APRIL 19-21
BOSTON APRIL 26-28
TORONTO MAY 12-14
WASHINGTON, DC MAY 19-21
CALGARY JUNE 7-9
HOUSTON JUNE 28-30

STRATEGIES FOR SOFTWARE DEVELOPMENT

SAN FRANCISCO MAY 12-14
CALGARY MAY 17-19
LOS ANGELES JUNE 23-25
CHICAGO JUNE 28-30

INTERNAL CONTROLS AND DATA SECURITY WORKSHOP

SAN FRANCISCO APRIL 14-16
CHICAGO APRIL 19-21
BOSTON APRIL 26-28
HOUSTON MAY 3-5
TORONTO MAY 10-12
CALGARY MAY 24-26
NEW YORK JUNE 2-4
WASHINGTON, DC JUNE 7-9
DENVER JUNE 21-23

AUDITING STRUCTURED ANALYSIS AND DESIGN WORKSHOP

SAN FRANCISCO MAY 17-21
NEW YORK JUNE 14-18

STRUCTURED PROGRAMMING IN COBOL

BOSTON APRIL 20-21
NEW YORK MAY 6-7
DALLAS JUNE 21-22

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YOURDON

Calls Issue 'Red Herring'

AT&T Rival Blasts Residential Subsidy Notion

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Bill McGowan, the feisty chairman of MCI Telecommunications Corp., one of AT&T's major competitors, last week vigorously attacked the widely believed notion that users of interstate telecommunications services are subsidizing the telephone company's residential customers. This is a key issue in the great debate over national telecommunications policy — one with special implications for users and suppliers of computer-based services.

One suggested way of replacing the subsidy after Bell operating companies are divested in line with the antitrust settlement worked out last month by AT&T and Justice Department lawyers is to "unleash the Bell operating companies" and allow them to offer "enhanced" services — that is, computer-based information offerings, McGowan said. Under the settlement agreement they can provide only local exchange and exchange-access services.

McGowan, testifying last week before the House of Representatives Telecommunications Subcommittee, called the alleged residential subsidy a "red herring" and cited two studies to support his charge.

One, conducted by Dr. William Melody, a widely known telecommunications economist, was part of

the evidence developed by the government to support its antitrust charges.

The other study was conducted by the North American Telephone Association (Nata), which represents independent telephone/private branch exchange (PBX) manufacturers.

"Both studies demonstrate that Bell's competitive private lines and terminal equipment do not meet their costs," McGowan said, "and the Nata study shows that the revenue shortfall would more than absorb the total amount of the alleged 'subsidy,' leaving nothing to subsidize local rates."

Melody Study

The Melody study, which analyzed Bell operating companies' operations in 21 states, used "Bell's own costing methodologies," according to McGowan, and found that out of the 21 states, "local service requires no subsidy in 14. In six states, local service was shown to be 'below cost' only because Bell artificially and irrationally categorized nontraffic-sensitive costs as local 'direct costs' whereas in the other states such costs were treated separately."

Shortly after McGowan finished testifying, Rep. James Scheuer (D-N.Y.), who has repeatedly expressed concern about the financial viability of the Bell operating companies after

divestiture, asked whether they should be "unleashed." While McGowan thought that letting Bell operating companies offer competitive as well as monopoly services would "destroy" the proposed antitrust settlement, not all of the other speakers agreed.

The "stringent limitations" imposed by the settlement agreement on Bell operating companies' activities "give rise to questions concerning their longer term profitability," according to Robert W. Burke, a senior vice-president of Moody's Investors Service.

Cellular Radio

Robert F. Barrett, vice-president of the American Municipal Bond Assurance Corp., thought the Bell operating companies should be allowed to offer cellular radio services; this would be one way of compensating for the 40% to 50% loss of revenue he said the Bell operating companies would suffer after divestiture.

William B. Forster, a vice-president of ITT, suggested that limiting the Bell operating companies to tariffed local-exchange services would be inconsistent, since non-Bell carriers such as United Telecommunications, Inc.; Continental Telephone Co.; and General Telephone and Electronics Corp. are already involved in a wide range of activities.

These other activities include ter-

restrial manufacturing, a nationwide packet-switched data communications network, long-distance communications by satellite and operation of commercial on-line service bureaus, Forster said.

Robert Bennis, manager of communications systems at Westinghouse Corp., appeared at the hearing on behalf of the International Communications Association, a user group that includes the nation's 500 largest corporations. Bennis said: "I don't necessarily believe the Bell operating companies have to be restricted ... so long as other sources of supply are available."

Bennis pointed out that his company recently decided to build its own private microwave network in the Pittsburgh, Pa., area only because the carrier offerings did not provide cost-effective teleconferencing and high-speed switched data transmission.

Complete Separation

However, Fred Lafer, vice-chairman of the Association of Data Processing Service Organizations, Inc. (Adapso), along with Michael Morris, general counsel of Rolm Corp., a major PBX maker, said that if competitive services are offered locally they should be done by organizations completely separated from the Bell operating companies.

To a large extent, this argument over whether it is necessary to shackle the Bell operating companies mirrors the argument over whether tighter reins should be imposed on AT&T's Long Lines Division. As Adapso's Lafer pointed out, the Justice Department-AT&T agreement frees the phone company from its 1956 Consent Decree, enabling AT&T to offer computerized information services. "Once having entered such an unregulated market, AT&T would have the incentive and opportunity to use ... its control over the intercity communications network to thwart competition," he said.

If fears of higher local telephone rates ultimately persuade Congress to let the Bell operating companies offer unregulated services, one way of implementing the policy would be to make the divested operating companies subject to the Federal Communications Commission's Second Computer Inquiry decision. This would be relatively simple because the decision already covers the Bell operating companies in their undivested state.

But many sectors of the computer industry are unhappy with the Computer II ruling. As implied by Lafer at the House hearing last week, these critics believe the commission has not adequately restricted the opportunity of AT&T's Long Lines Division to engage in anticompetitive behavior. If the divested Bell operating companies are brought in under the Computer II umbrella, the criticism will almost certainly increase. One likely result is further delay in bringing to market the enhanced services that data communications users have been promised for years.

Datacomm Briefs

Microband Asks Nod For 'Wireless Cable' Net

NEW YORK — Microband Corp. of America, a subsidiary of Tymshare, Inc., last week requested authority from the Federal Communications Commission (FCC) to establish microwave-based "wireless cable" systems in the nation's major cities.

Possible applications include tele-shopping, home banking and other applications that involve interaction between a remote terminal and a central data base.

Microband, which operates omnidirectional multipoint distribution services (MDS) in several cities, wants to use these facilities to provide the new service. MDS operators can transmit only in one direction, from transmitter to terminal, but the company is proposing to use telephone circuits for the return.

If this proposal is approved by the FCC, Microband officials said its company and other carriers would be ready to begin offering service six months later.

Federal Express Joins Dems Applicants' Ranks

WASHINGTON, D.C. — Federal Express, the air courier service, has become the latest firm to ask the Federal Communications Commission (FCC) for authority to establish a digital end-to-end communications network to handle electronic message, teleconferencing, data base retrieval, computer-to-computer file transfer

and other wideband services.

Fourteen other firms previously filed applications for digital electronic message services (Dems). Twelve applicants have proposed "extended" Dems nets serving more than 30 cities; the other two, along with Federal Express, want to operate "limited" networks. Federal Express has proposed that it establish a 15-city net.

Although Dems promises to make business data communications significantly more cost-effective, it may be a while until the networks go on the air. One problem: Only seven channels have been allocated by the commission for extended networks, and there are 12 pending applications.

In addition, one contender, Tymnet, Inc., is opposing the application filed by another, Insurance Systems of America (ISA), because of fear that a telephone carrier would injure unfair competition. ISA recently became a wholly owned subsidiary of United Telecommunications, Inc., a major independent telephone company.

The FCC was scheduled to act last week on a plan for dealing with the competing applications for extended Dems licenses. The commission overruled Tymnet's complaint opposing telephone company entry on competitive grounds, but said that this question could be considered later, after ISA has amended its Dems application to reflect the new ownership.

Bell Must Give Figures On Developing Services

WASHINGTON, D.C. — AT&T must disclose how much it expects to spend on the development of all the enhanced services it is planning, the Federal Communications Commission's (FCC) Common Carrier Bureau told the phone company early this month.

This is one of several information items AT&T was requested to supply before its proposed capitalization plan for XYZ, Inc. is finally considered by the commission. XYZ is the temporary name of the fully separated subsidiary that AT&T intends to establish, pursuant to the Second Computer Inquiry Decision, to offer computer-based information services on an unregulated basis.

The Advanced Communications Service (ACS) is the first offering planned by AT&T. AT&T was also asked by the Common Carrier Bureau whether it had disclosed information concerning the ACS packet network to prospective competitors, as required by FCC rules.

Among the other questions were:

- How implementation of the proposed antitrust settlement negotiated last month between Bell and the Justice Department will change estimated capital spending for XYZ.

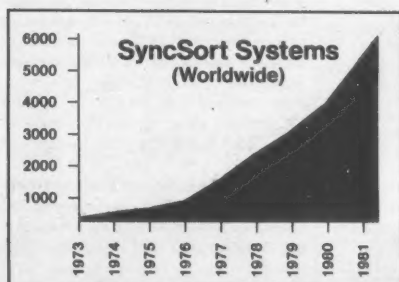
- How AT&T "identified and recorded" the marketing and research and development costs, as well as the return on investment and depreciation related to ACS.

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But the rapid growth of SyncSort CMS surprised even us. At the ripe old age of seven months, it already has over 200 users. In fact, it's growing at a faster rate than its oldest sibling - SyncSort OS - did at a similar stage in its development.

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You'll be impressed by how little Elapsed Time, TTime and SIOs it requires to handle any sorting job. And you'll detect a sharp reduction in your response time, and a sharp increase in your systems throughput.

2. SUPER PROGRAMMER PRODUCTIVITY. SyncSort CMS has the same handsome features as its older brothers. Basic features like dynamic allocation of disk space, VSAM as input or output, and the ability to invoke COBOL, PLI or Assembly programs.

And advanced features like:

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- Report Formatter—for reports with headings, pagination and dating.

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Operators Soon to Be Bypassed

Report Sees User-System Interaction Increasing

By Jake Kirchner

CW Washington Bureau

WASHINGTON, D.C. — The trend toward more direct user interaction with computer systems will accelerate rapidly during the 1980s, according to a recent Arthur D. Little, Inc. (ADL) study for the National Bureau of Standards. Soon, ADL said, almost all users will bypass system operators.

"By the early 1990s," according to ADL, "it is reasonable to expect that

network systems will be available that can handle voice and digitized image material as well as data and text, that can assist the users in discovering and using systems resources and that can control themselves within the bounds of normal operations."

Interactive systems capabilities are "primarily a matter of software technology," ADL noted, but the trend will also be facilitated by certain kinds of future hardware technol-

ogies:

- Nonimpact printing is the most rapidly advancing of these technologies. By 1985, a broad range of xerographic and ink-jet printers will be available with speeds of from one to more than 100 page/min and priced from \$500 to over \$200,000, the study said.

- They will variously offer multi-font and full graphics capabilities in full color at a resolution equaling that of typeset printing and will

make the communicating copier possible," the study added.

- Display technology will advance more slowly. CRTs "will remain dominant through the 1980s but with increasing capabilities resulting from improved support electronics — including color, improved resolution, split screen, three-dimensional perspective and multiple bit planes." Toward 1990 flat-panel displays with superior resolution may slowly become dominant.

- Voice and document scanning digitizers will decline rapidly in price. "As a result," ADL said, "interactive systems will by 1990 be able to intermix freely voice and image material with data and text for transmission purposes, but through 1995 their ability to automatically determine the content of voice and image material will remain limited."

- Through 1985, improvements in data entry will come mostly from improved methods of key entry, including software-supported applications allowing selection of prestored items for entry.

In discussing capabilities available to systems analysts, ADL said that by 1990 analysts "should be able to move from review of raw data through a variety of research and evaluation processes to the preparation of a finished report in a continuous process at a single terminal."

For them, "interactive systems will be able to conduct dialogs in terms of the items contained in the data bases and of the processing facilities available."

Most programmers, ADL said, will work with interactive systems in much the same way as analysts. By 1985, programmers "will generally work from the start [of applications development] at terminals through which the system displays its resources to them for selection and helps to assemble, test, correlate and document the body of their work as it evolves."

Formal programming languages will "increase somewhat as the strong data-typing languages initially developed for minicomputers (primarily Pascal and Ada) come into widespread use," the report said. Cobol, Fortran and PL/I will continue in use, "but will evolve in the directions of modularity and data independence."

NBS Study: Bus-Oriented CPUs Coming

(Continued from Page 1)

The system will contain multiple processors dedicated to specific system functions. The function of each processor "will usually be determined by alterable microcode," ADL said. "The processors will communicate with one another via messages and data blocks in standard form, regardless of whether the content is a program, data or digitized text, imagery or voice," according to the report. The multiple processors will reportedly allow fail-soft operations.

There will no longer be a single shared storage area serving all processors, ADL said, but rather storage dedicated to individual processors or clusters.

Clustered Processors

Clustered processors will be configurable in arrays for specialized computing tasks, but in general, each system will contain (for standard applications) several clusters that include:

- A supervisory processor containing redundant small processors that will assign subsystems to individual uses and handle diagnostic chores.
- An I/O processor that will be standard.
- Many types of file processors that will be available by 1985, according to ADL. They will be redundant for reliability and "many incorporate associative and/or parallel processing capabilities for searching and retrieval." They will be able to handle data, text and digitized imagery and voice.

- "Application processors that will be dedicated to particular computational environments. Some will be oriented to direct execution of programs written in specific languages. Others will support problem-oriented languages (e.g. for simulation)." And others will run software of obsolete machines. "The orientation of each will be specified by alterable microcode," according to the ADL study.

- Specialized processors, including array and vector processors and perhaps others designed for voice and pattern recognition, that will be available in the 1985-1990 period.

ADL noted that "modern minicomputers approach this architecture now" and said, "By the late 1980s, virtually all information systems will employ this type of architecture. In the interim, the systems available will be of a transitional nature."

By 1985, the study continued, distributed data processing (DDP) in

some form will be universal for almost all users.

File management control needs and the problems of nonstandard communications protocols will constrain DDP growth, although the latter problem is being addressed by protocol conversion hardware and software.

Increased Compatibility

Turning to software in future systems, ADL said compatibility and transportability will increase. Old programs will still be usable as microcoded processors proliferate, but users not willing to undertake "onerous conversion" projects will not be able to take advantage of all new system capabilities, ADL cautioned.

Transportability of programs within lines of compatible modules "will be relatively easy by 1985," the study said, and after 1990 standards will be supported by all vendors for a variety of data representations, procedural and interactive languages and for communications at the message level.

ADL offered three guidelines for users "wanting to remain as vendor-independent as possible":

- Programming should be in standard high-level languages.
- Programs should be modular. In particular, I/O and file processing functions should be separate from computational ones.
- Intersystem communications should be conducted according to Information Systems Office standards, which will probably be supported by all vendors at this level.

ADL added that "hardware modules that are to be retained as the in-

formation systems evolve (terminals, communications controllers and processors) should as far as possible have their specific functions and interfaces established by microcode and software, rather than by fixed wiring."

In terms of security, ADL said it envisions "no major effort" to improve on the National Bureau of Standards Data Encryption Standard, which should be satisfactory for commercial users.

Security kernel architectures and relational capabilities of file processors will increase the security of most systems, and by 1990 all mass storage systems will be equipped with automatic journal facilities — inaccessible to users — that record all changes and/or all references to a data base.

Higher Costs

Turning to cost considerations, ADL said that in 1995 users will likely pay more for DP systems than they do now because of added functions, including interactive capabilities and voice- and pattern-recognition functions, which require greatly expanded computing power.

In addition, future software costs are likely to be 40% to 50% of hardware costs, compared to the 25% or less figure of today's systems, ADL said.

The future systems analysis is contained in a report titled "The Effects of Future Information Processing Technology on the Federal Government ADP Situation."

The report, No. PB 82-138181, is available for \$12 from the National Technical Information Service, Springfield, Va. 22161.

IBM Cuts Accrual Rates on 30 Series

(Continued from Page 1)

power unit, the 3814 switching management system and the 3848 cryptographics unit.

Hardware with a 55% accrual percentage will receive a 45% accrual rate. This group includes the 3017 power unit, the 3027 power and coolant distribution unit, 3031 processors, 3032 processors and the 3041 attached processor, according to a spokesman.

The 60% accrual rate for the Model 3838 array processor and the 4341 unit has also been cut to 50%.

The policy change came as part of a normal business review, a spokesman said.

Jack Hart, an analyst with International Data Corp., maintained that the accrual rate change is aimed primarily at 3081 processors.

Pointing out that all of the other hardware on IBM's list has been leased for some time, Hart called the additional equipment a "smoke screen" to avoid angering 3081 customers.

Less Attractive Option

By lowering the purchase option percentage, IBM makes leasing hardware a less attractive option, Hart said. A 3081D processor, for example, costs an estimated \$93,000; he explained.

If a user loses 10% of that purchase price, or \$9,300, each month over the course of a two-year lease, that user has lost more than \$200,000, Hart noted.

In addition, the accrual rate change may help IBM to avoid a large leased base for a given product before it becomes an unviable contender in the market.

For example, there is a large leased base of 3033 processors. With the announcement of the 3081, it became clear that IBM would either have to convince the users to purchase the 3033 systems or face the alternative of deinstalling the older processors, Hart said.

Data Base Helps Tie Money to Drug Kingpins

(Continued from Page 1)

"Only about 50% of the financial institutions, which were mostly banks, were filing the proper forms," Rosenblatt said, "and most of those were not filing completely." Various forms required by the IRS, Customs Service and the U.S. Treasury must be filed within 15 days of a deposit, withdrawal, transfer or exchange of more than \$10,000 or the mailing/shipping of more than \$5,000 (see box).

Bank Involvement

"We found that many financial institutions were working hand in hand with the depositors," IRS spokeswoman Ellen Murphy said. By not filing the necessary currency transactions forms, the banks were aiding the criminals in laundering drug money, she said.

"The very nature of the drug trade is cash," Rosenblatt added. "When someone buys a kilo of drugs, the seller expects a cash sale only." By focusing on the cash, Rosenblatt, 42 customs agents and three attorneys plan to disrupt drug organizations by tapping their capital, he said.

To find the cash, the Customs Office in Washington, D.C., uses the Treasury Enforcement Communications System (Tecs) data base. The data base contains information from the forms submitted by the banks, allowing some 30 investigators of the Reports Analysis Bureau to monitor unusual transactions, according to Harry Sedan, chief of the bureau, which services six federal law enforcement agencies.

Cross-Referenced List

Because "some of these transactions may be completely innocent," Sedan said, the investigators cross-reference the list of possible offenders with a list of suspected or convicted criminals. According to Sedan, the computer's ability to make the lists more manageable is its most important function.

Once a "hit" — a match — is made, that name is investigated to find any cohorts that may be working with the possible offender. At this point, the officials in Florida move into action, Sedan said.

The Reports Analysis Bureau uses a Burroughs Corp. B7700 mainframe to act as the analysis component of a number of federal law enforcement agencies, including the Federal Bureau of Investigation, according to a spokesman.

The B7700 is capable of handling 1,200 terminals stretched across the country for access to the Tecs data base, Peter Caputo, information management specialist for the Law Enforcement Systems Division, said.

All the software for the system, written in Algol, was developed in-house, Caputo said.

In addition to the arrests in drug trafficking, Operation Greenback has also yielded misdemeanor arrests of those who have not paid strict attention to the nation's currency laws. But, Rosenblatt emphasized, "We're directing our attention on tracking money involved with felonies. We handle the misdemeanors quick and dirty."

Data Base Info Comes Off Three Forms

WASHINGTON, D.C. — The information in the Treasury Enforcement Communications System (Tecs) data base comes from three forms that banks and individuals must file with the Treasury Department and its branches: the Customs Service and the Internal Revenue Service. According to Customs official William Rosenblatt, they are:

- The Currency Transaction Form 4789 must be filed within 15 days by any financial institution handling a deposit, withdrawal, transfer or exchange of \$10,000 or

more.

- Customs Form 4790 must also be filed within the same time period when there is a shipping or mailing of \$5,000 or more outside the country.

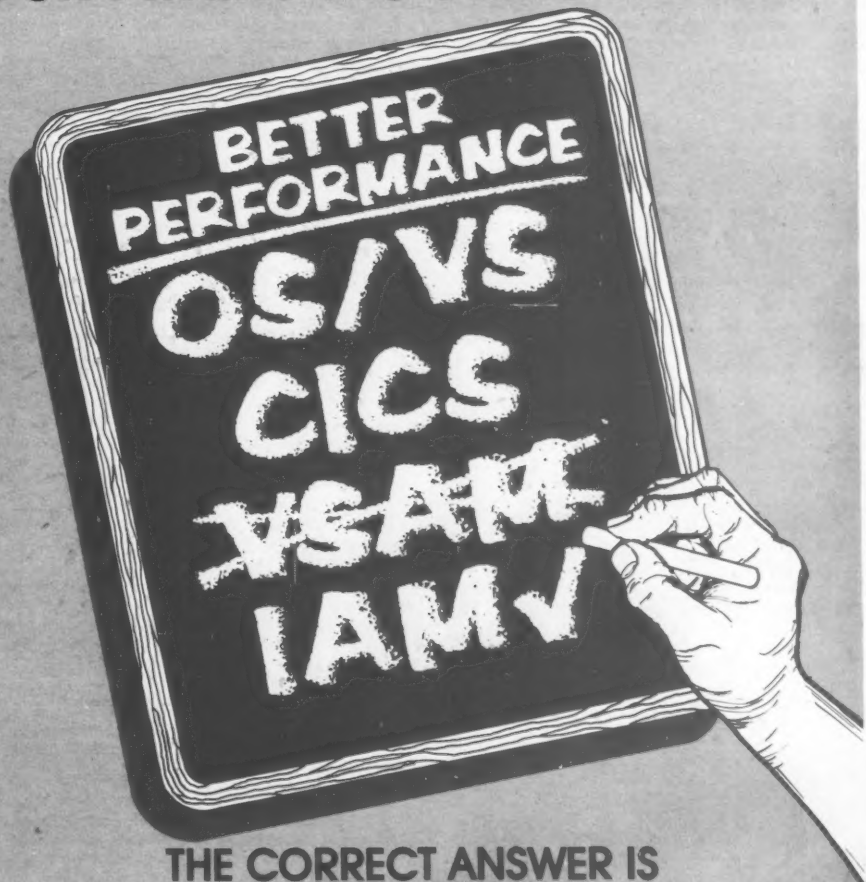
- Treasury Form 90.22-1, the foreign account version of Form 4789, must be filed for tax purposes by anyone who has a foreign bank account. "If you can't get the foreign banks to give the information, then you require the individual with the account to do so," Peter Caputo, information management specialist for the

Law Enforcement Systems Division, said.

With these three forms, all aspects of currency exchange are covered — domestic, foreign and the movement in between, said Caputo.

According to customs officials in Florida, the filing of these forms, at one time a regulation commonly ignored in that state, has increased since Operation Greenback started tracing the drug traffickers' trail of money through the banks.

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Consultant: CAD/CAM Users Pushed to Wall

By Jeffry Beeler

CW West Coast Bureau

ANAHEIM, Calif. — Many users of computer-aided design and manufacturing (CAD/CAM) systems quickly exhaust the capabilities of their existing equipment and suddenly find themselves left with no room for expansion, according to Peter Cunningham, Input, Inc. founder and president.

Unlike their counterparts in the business computing field, where families of compatible and expandable systems have long been commonplace, many CAD/CAM equipment suppliers have yet to develop a

means for their customers to migrate upward, he said.

The result is that many users of CAD/CAM systems "run up against a wall" not long after the hardware is installed and are left to do all the subsequent upgrade work on their own, Cunningham maintained.

In the area of providing ready upgrade paths, "vendors can do a better job of helping their users than they've done in the past," the head of the Palo Alto, Calif.-based consulting firm said.

Cunningham's remarks came during the second day of a three-day industry gathering last week spon-

sored by Prime Computer, Inc. and 24 other vendors, all of which sell Prime-compatible software or peripherals.

Dubbed "Spectrum of Solutions," the event combined a small product exhibition with a conference program consisting of three featured addresses and 23 technical workshops.

During a keynote speech dealing with "Trends in CAD/CAM," Cunningham pointed to an Input-sponsored research project that suggests users of automated design and manufacturing systems often underestimate the risks to their data security. The threat becomes especially seri-

ous whenever CAD and CAM systems are integrated, as is increasingly the case.

Some breaches of data security result from unintentional human errors. Others are caused deliberately and are often the work of disgruntled employees.

But either way, the introduction of faulty data into an integrated CAD/CAM system "can really mess you up," Cunningham warned. "Advertently or inadvertently, people can give your system bugs and hooks that can take a long time to correct."

He characterized data security concerns as one of the chief obstacles to continued CAD/CAM integration. "The more you integrate, the more you put your eggs in one basket," he said.

Other Barriers

Other barriers to CAD/CAM integration include high cost, lack of accepted standards and incompatibilities among the hardware and software modules from which finished systems are produced, according to Cunningham.

In addition, the payoffs from an integrated CAD/CAM system are often much more subtle than the benefits from automated design and manufacturing facilities that are installed and operated independently, Cunningham said.

But for all its many impediments, the concept of CAD/CAM integration has never lacked for supporters. Part of the reason is that an integrated system allows its users to capture information at the source and disseminate the material electronically rather than manually, he said.

In other comments, Cunningham advised users not to allow their automated design systems to become too widely separated from their manufacturing activities and corporate management. "If CAD is removed from CAM and management," he said, "a company can begin to slide down a very slippery slope that can change the way the organization does business."

Firms Seen Underfunding DP Resources

(Continued from Page 1)

shackled by outmoded applications, Buss said at an industry trade gathering here last week.

To help combat the shortfall in information systems investment, Buss urged computing department managers to buy as much software as possible off-the-shelf rather than develop it in-house.

Prepackaged software, he said, can contribute significantly to a company's efforts to renovate and replace its aging, obsolete applications.

In general, prepackaged software costs only about half as much as its internally developed counterpart and can be brought on-line up to 75% faster. Canned programs also have the advantage of freeing scarce technical specialists to work on applications unique to their employers' needs, Buss said during the Spectrum of Solutions conference sponsored by Prime Computers, Inc.

Success and Management

Success in using prepackaged software, however, depends to a large degree on how actively senior management participates in the product's implementation.

Top corporate executives need not involve themselves in the purchase of minor software packages. But with the acquisition of crucial or highly expensive applications, senior management should oversee all product evaluations and selections, participate in problem definition and take personal responsibility for ensuring the software is installed pragmatically, Buss said.

The ADL consultant also urged top executives to make sure the implementation of large-scale canned programs dovetails with their company's long-term objectives as well as with their traditional methods of operation.

On the subject of problem definition, Buss disputed the common wisdom that user requirements should be specified immediately. Don't define your requirements too soon, he counseled the conference attendees. Instead, corporations should form representative project teams to ensure that each major installation of prepackaged application software enjoys strong, companywide support.

Buss also challenged the widespread belief that off-the-shelf user

programs are easier to install than software produced in-house.

Even with canned applications, he warned, "files still have to be converted, and users still have to be trained and documents still have to be written," he said.

Modify Procedures

Another of Buss' unconventional convictions is that companies should modify their procedures to suit their prepackaged software rather than take the reverse approach. In general, Buss explained, extensive tinkering with an off-the-shelf application does the product more harm than good.

In other remarks, Buss blamed the obsolescence of many firms' hardware and user software on senior management's mistaken perception that information processing systems can operate indefinitely without replacement.

"Many high-ranking executives seem to think that computers are like old soldiers, that they never die," he said. "But the fact of the matter is that computers are more like old roads that gradually become full of potholes."

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Bell: Wats Hikes Not Altering Use

WASHINGTON, D.C. — When the Federal Communications Commission last May accepted AT&T's revised tariff for Wats, imposing significantly higher rates on heavy users of the service and lowering charges for the others, the commission told the telephone company to report this February on how the new rates were affecting network usage.

A major reason for adopting the new Wats tariff, according to a knowledgeable source, was to "increase network efficiency" — reduce the usage peaks and valleys. Another aim was to soften the impact of the higher rates.

The vehicle for achieving both objectives was a "time-of-day" pricing scheme that offered hefty discounts to Wats customers who used the service at night and on weekends, according to the source. However, time-of-day pricing appears to have had little affect.

Next Month's Computerweek Keynoter

Exec: Top Brass Must Teach DPer the Business

By Marguerite Zientara

CW Staff

CAMBRIDGE, Mass. — Top corporate management must take responsibility for teaching DP managers about the business their companies are in — the DPer are not going to do it themselves, John M. Thompson said in an interview last week. Vice-president of Index Systems, Inc., a management consulting firm here, Thompson will be the keynote speaker for Computerweek, to be held March 2-5 in San Francisco.

At the conference, Thompson will explain why he feels the information systems business "has lost its way." Sponsored by *Computerworld*, *Computer Business News* and *Infoworld*, the conference will be the forum for Thompson's insights into the present DP environment, "where we have scarce resources — people and money."

"Into that environment we inject three major types of demands," Thompson said in an interview last week. The first demand is to replace old, obsolete software applications systems; the second is management's desire for on-line, interactive decision support systems; and the third demand is that we use the technology.

Those three demands, in light of the scarcity of people and money, pose the question of which system to build, he said, noting, "You can't build them all."

Obsession with Technology

"The old way of looking at that question — the way we've had up until now — has been to form user steering committees, DP steering committees and to have backlogs that we've managed and rethought in an effort to catch up with them," Thompson said.

"But it doesn't work," Thompson added. "What has come out of that has been an excessive obsession with the technology."

While most organizations grapple with the same information systems issues — such as networking, distributed data processing, centralization or decentralization, IMS and personal computers — none of the issues has anything to do with the company's business, Thompson said.

"There's such a strong cultural prevalence of technical issues that the information systems business has lost its way," he claimed. "Senior management — the guys who pay the bills — notice that, and they have an intuitive feeling that all is not as it should be. [Managers] believe what they read in trade journals — that the aggressive use of information is critical to the success of the organization — and they want good information systems," he observed, "but every time they try to understand what the barriers are, they get presented with all the technical issues."

Because of the culture gap that exists between senior management and the technology, management "feels too stupid to make a contribution," Thompson said. "So either they get frustrated and fire the DP manager — which often happens — or they just get frustrated and communica-

tion gets worse and worse."

The solution to the problem lies in education, according to Thompson. Senior managers "should be taught what they can and cannot expect from DP — not how a computer works, not how to write programs."

In addition, management should include the senior DP people in conversations about business. "Bring them into the appropriate committee structure, share with them the business decisions that you're making so they can get an understanding of what your business is all about," he added.

"It is the responsibility of senior management to do something about

the problem — you can't expect the DP manager to," Thompson stressed. "Only when business management gives [management information systems] people the leadership they need to yank them back into the business will DP people be able to give the technical leadership the business really yearns for."

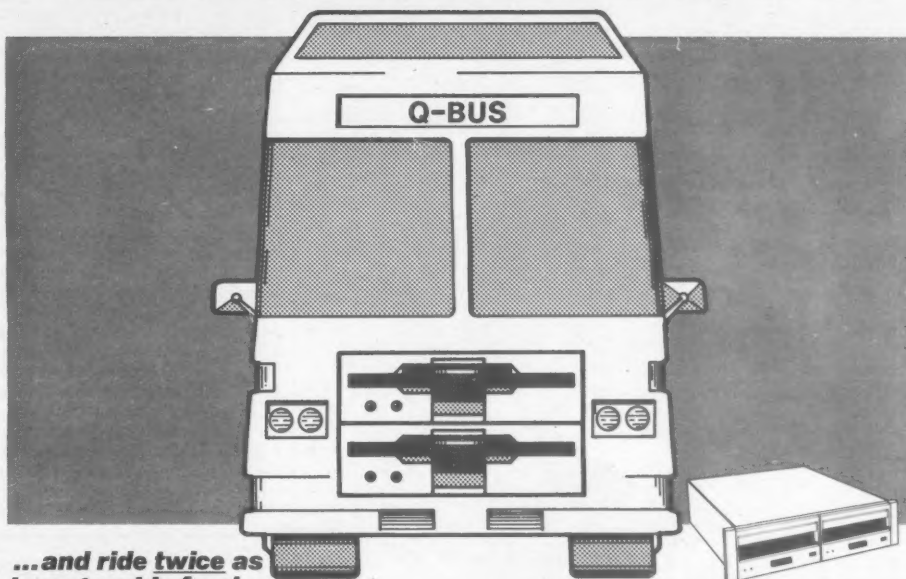
Computerweek attendees will learn various methodologies of strategic business planning, which they can "borrow" to use in their strategic systems planning.

Thompson has been vice-president of Index Systems for more than eight years, helping to develop the company's strategies and policies.



John M. Thompson

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Hospital Supplier Takes New Approach MIS Group Regains End User's Confidence

By Jim Bartimo
CW Staff

BOSTON — The Kendall Co. here is trying a new approach to overcome credibility problems stemming from poor communications between end users and designers of its computer systems.

"One of the problems that [management information systems] MIS departments have is that they are made up of technocrats. A communications gap arises between the users and the system designers, causing the system to fall short of the needs of the users," according to William N. Harris, director of MIS.

Kendall is the sixth largest hospital supply company employing 13,000 people internationally. In addition to the familiar consumer products of Curity, Kendall also markets other health care products and some industrial products such as adhesive tape. The firm is a wholly owned subsidiary of the Colgate-Palmolive Co.

After a year at Kendall, the 43-year-old Harris found that the department was not sympathetic enough to users' needs. As a result, end users did not have confidence in the ability of the MIS department, he said.

In order to address this problem, Harris is overseeing the installation of a business systems function within the MIS department. Representatives will be sent out to work with the users, determine their needs and



William N. Harris
CW Photo by J. Bartimo

incorporate those requirements into the design process, he explained.

Harris pointed out that the time is right for a change as the company moves into an era of rapid growth.

"The rapid growth of Kendall has made its systems obsolete and the future growth plans are ambitious. We need to get today's systems working so tomorrow's will too," according to Harris.

The new business systems staff will include six analysts with strong backgrounds in both DP and business management, Harris said. This

combination of DP and management background is typified by Warren Harkness, the head of the group. Harkness was the manager of management consulting services for the Xerox Corp. in Rochester, N.Y., before he joined Kendall.

It would be ideal for the business analysts to have a mix of 75% management and 25% DP experience, according to Harris. Even if the proportions do not meet these exact criteria, the group will include both computer people with management backgrounds and management people with computer savvy. About half of these professionals have been hired, he noted.

Analysts' Roles

The analysts will service each of Kendall's departments, Harris said. They will act as salesmen/diplomats for the MIS department and internal consultants for the business needs of the users. They will also keep abreast of the competition's methods and ensure that all the company's systems are integrated, Harris explained.

Utilizing these professionals in the field is a step-by-step process, according to Harris.

Suppose, for example, there is a problem in the firm's manufacturing area. The business system analyst would be called in to work with the manager of that area.

First, he would perform a feasibility study incorporating the Manufacturing Department's input to determine a solution to the problem. When the study were complete, it would be reviewed by a steering committee made up of MIS and user department members, Harris said.

The project would be assigned a priority and compete with other projects required by other departments.

If the manufacturing project were given a high priority, project work would begin immediately. The creation, implementation and testing of the system would be performed by the Systems Development Department and coordinated by the business systems analyst subject to tech-

nical reviews by the steering committee, Harris said.

In any given year, he estimated, 12 to 18 such projects of varying size and complexity could be underway. "You only want one or two 'high-risk' projects," according to Harris.

A high-risk project is large, complex and new to the department. Harris likens project management to financial management — you need to have some guaranteed successes before you enter the high-risk, high-yield areas.

New Directions

With the introduction of six new DP professionals, there is some possibility for political jealousy within the DP department. But Harris said the staff welcomed the new direction these professionals would provide.

"It depends on how you sell it to them," he said. "We said it was a sign of growth and a lot of people feel good about these people."

In addition, Harris hopes to boost employee motivation by allowing nonexempt workers to move up and become programmers. "By increasing our training tenfold, we're offering an opportunity for these people to learn programming," he said. This will serve the additional purpose of allowing senior programmers to perform more creative programming and less maintenance, he added.

The firm's processing environment includes two IBM 3033 mainframes with the IMS data base management system and an MVS operating system. "We have all the standard IBM equipment," he said.

"I've done this at other companies," Harris said of the reorganization he oversees. Prior to joining Kendall, he was director of MIS at Hammermill Paper Co. in Erie, Pa., and a senior manager at the management consulting firm of Price, Waterhouse and Co. in Chicago.

Harris received his M.B.A. from the Kellogg School of Management. He received his undergraduate degrees from Cornell University and Boston University.

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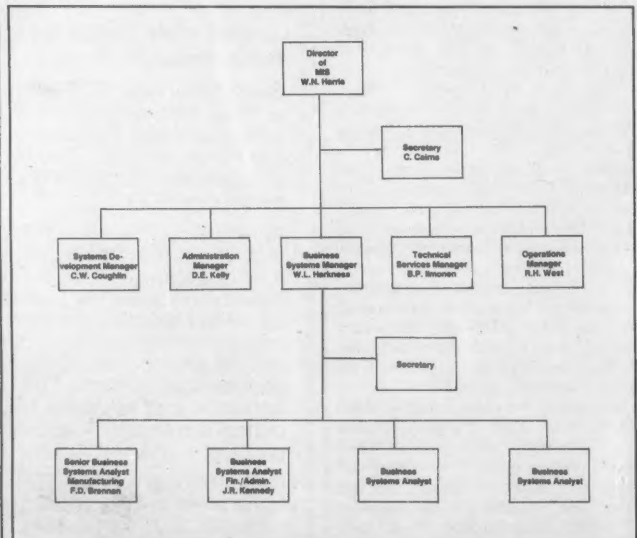
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For DP Managers

Study Covers Six Steps to Quality Assurance

By Brad Schultz

CW New York Bureau

ORLANDO, Fla. — A new study on DP quality assurance identifies six steps by which DP managers can consistently deliver resources acceptable to end users.

In "Hatching the EDP Quality Assurance Function," available from the Quality Assurance Institute here, author William E. Perry calls the first step definition of the quality assurance role. Next, DP managers should incorporate quality assurance in the DP function. Then quality assurance personnel should be selected.

The fourth step is defining quality assurance tasks, Perry wrote; the

fifth is "building a quality environment." After that is the final step Perry calls "success."

How do you define the quality assurance role? DP quality is shaped by many factors, Perry said, including correctness of programs and their reliability, efficiency of resources, control over unauthorized access to software of data, maintainability, testability, portability and reusability.

DP management needs to develop standards for each quality assurance criterion, he asserted, and promulgate these standards among the DP staff.

However, that role is just a portion

of what DP managers really do. Other responsibilities include meeting production schedules and working within budgets, Perry pointed out.

DP managers frequently fail to anticipate "expectation gaps" among end users, he declared. Such gaps occur when end users themselves fail to anticipate bugs in software and other implementation programs.

"Users not knowledgeable [in DP] truly believe that the computer can do anything," Perry remarked, so implementation problems lead some users to believe they are stuck with a "lemon" computer system when the newly delivered system is really coming to life as well as could be

expected.

To avert expectation gaps, DP managers should try to write reasonable specifications for quality into the orders systems developers receive. Progress toward fulfillment of orders should be periodically reviewed during development and implementation, Perry indicated, so end users are never significantly surprised by hitches.

According to Perry, "common management myths about quality" are that quality cannot be measured; quality lowers productivity; poor quality means poor workers; and quality is the responsibility of the "quality department." The cost of quality, he stated, is the sum of the costs of prevention, appraisal and failure.

The cost of prevention is the money spent to prevent errors. Prevention entails quality audits, planning quality improvement, quality training, quality assurance consultation and applications installation methods, Perry said.

The cost of appraisal, Perry continued, is the money spent to ensure that the completed work meets user requirements. This entails preparation for reviews, conducting reviews, preparation for tests and conducting tests.

A quality assurance charter is necessary to incorporate quality assurance in the DP role, Perry said. The charter determines the caliber of people needed to fulfill quality assurance responsibilities and notifies affected parties of the quality assurance group's responsibility and authority.

User Rankings

Perry's study cites a 1979 survey by Guide International, an IBM users group, which asked users to rank (in order of importance) the various responsibilities of quality assurance groups. The survey reportedly derived the following ranking from those IBM users:

- Reviewing and certifying documentation.
- Enforcing standards.
- Reviewing application system controls.
- Certifying systems.
- Recommending controls.
- Developing control standards.
- Assuring that practices are being followed.
- Reviewing systems design for completeness.
- Developing standards.
- Processing deviation requests.
- Consulting.

Guide International asked the same users to rank the responsibilities in order of time each activity tends to consume. Perry noted the four most time-consuming responsibilities of quality assurance groups to be ranked by the IBM users as reviewing documentation, consulting with application teams, resolving deviations from standards and evaluating operational systems.

The Quality Assurance Institute offers Perry's study for \$14.95 (cash with order) and \$17.95 (invoiced) at 9222 Bay Point Drive, Orlando, Fla. 32811.

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CW 2/15/82

Hearings to Probe AT&T Decree Compliance

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Whether the Federal Communications Commission (FCC) and the Justice Department will be able to monitor AT&T's compliance with the proposed consent decree negotiated last month by government and phone company attorneys will be the subject of congressional hearings early next month.

Beginning March 3, the inquiry will be conducted by the House Government Information Subcommittee, chaired by Rep. Glenn English (D-Okla.). Last fall, he criticized earlier attempts by the Justice Department to settle the AT&T case and also questioned letting AT&T offer unregulated services through one or more separate subsidiaries — a key provision of the FCC's Second Computer Inquiry Decision.

The recent announcement of the subcommittee's upcoming hearings came shortly after the General Accounting Office (GAO), the federal government's watchdog auditing agency, reported that the commission cannot adequately monitor the Computer II decision because the agency lacks adequate time, money and personnel and has not developed essential accounting tools. The report added that the AT&T/Justice settlement may impose additional burdens on the commission.

NBS Expands Place Coding

WASHINGTON, D.C. — The National Bureau of Standards Institute for Computer Sciences and Technology has expanded its computer coding to include more than 154,000 cities, townships and other population groupings.

The place codes are used to process geographical information, identify populated places, governmental units, statistical areas, military bases, airports and other facilities.

Called the Fourth Update Tape, this version expands coverage of Federal Information Processing Standard (FIPS) 55 by approximately 15,000 place codes. Tape features include:

- The complete file of incorporated places, census-designated places, townships, census county divisions and Indian reservations.
- Inclusion for the first time of Puerto Rico, the Virgin Islands, American Samoa, Guam, the prospective Commonwealth of the Northern Mariana Islands and the Trust Territory of the Pacific Islands.
- Identification of standard metropolitan statistical areas and congressional districts in which each census-matched item is located.

• An improved code system that provides easy identification of governmental and statistical areas which furnish national coverage without overlap.

The Fourth Update Tape and user guide are available now; the hard-copy version will be available soon from the National Technical Information Service, Springfield, Va. 22161.

"There is a question in our opinion," GAO said, "as to whether the FCC will be able to complete all of the tasks [needed] to deregulate enhanced services and customer-premises equipment [terminals]" by Jan. 1, 1983, as mandated.

Basically, the decision requires the commission to monitor a boundary established between basic services — which remain regulated — and enhanced offerings, to be marketed on a deregulated basis by one or more separate subsidiaries. But some sharing of operations is permitted between the regulated and unregulated parts of the Bell system, provided the related costs are properly allocated.

Regarding this latter task, GAO said that "given the problems which the

FCC has experienced in the past in allocating joint and common costs... and the short time frame which remains... it will be difficult for the FCC to meet its implementation schedule in this area."

Policing Ability Crucial

The FCC's ability to police separation conditions imposed by Computer II is "crucial to the success of the regulatory scheme created," the GAO report added. And that ability will depend on developing a dedicated auditing capability. However, according to the report, the commission "has not begun to design audit plans, nor has it decided how they will be carried out — by FCC auditors, outside firms, or through carrier

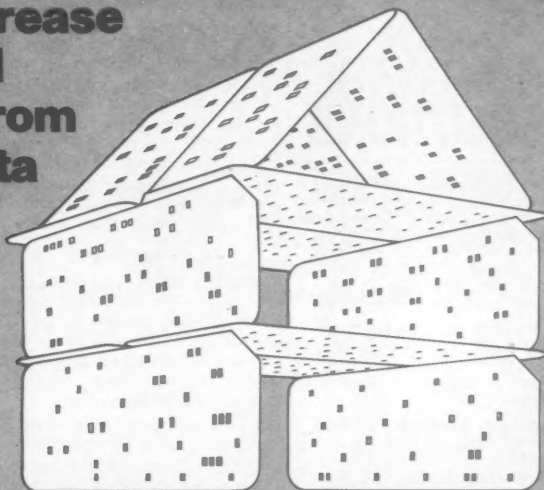
self-certification. It appears likely, however, that carrier self-certification will be heavily relied on."

To carry out the FCC's computer II responsibilities, the commission has set up a task force that consists of six persons but will be expanded "as soon as possible" to 17, GAO said. It noted that "while the unique nature of Computer II implementation makes it difficult to evaluate resource needs," implementing the decision is "likely to prove complex and resource-intensive." The commission employed a staff of 50 in the mid-'70s to investigate AT&T's private line rate-making practices, GAO said, and "even then experienced difficulty in fulfilling its regulatory responsibilities."

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Could Slash Costs

TCP/IP Expected in Commercial Products Soon

By Brad Schultz

CW New York Bureau

Two communications protocols expected to appear this year in commercial DP products can be implemented to allow major reductions in data communications costs, according to specialists interviewed recently.

That does not mean the Transmission Control Protocol (TCP) and Internet Protocol (IP) will immediately be implemented to achieve such benefits. But TCP/IP could allow users to send more bytes of data per packet through value-added networks that charge on a per packet ba-

sis, according to Bob Metcalfe, principal inventor of Ethernet, and BBN Computer Corp.'s Jack Sax, staff researcher.

This capability of sending several times more data at the same cost would be important to most data communications users, but the primary objectives of TCP/IP include smoother links between otherwise incompatible hardware, more efficient and reliable gateways between networks and standardization of the midsection protocols in popular network architectures [CW, Dec. 7].

Some sources predict TCP/IP will be standards for military systems and point to signs that the protocols will also be common in commercial systems, which already run the protocols in experimental settings.

Metcalfe worked on Ethernet and precursors to TCP/IP at Xerox Corp. before launching Mountain View, Calif.-based 3Com Corp. He said that TCP/IP can be implemented in three kinds of software: a computer's operating system, software resident in front-end processors and applications packages. BBN Computer Corp. took the first approach in developing TCP/IP for the Hewlett-Packard Co. HP 3000 commercial system.

Too Complex

However, mainframe operating systems from IBM and other major vendors are too complex for TCP/IP to be written in cost-effectively, Sax observed, so front-end processors are more likely to house implementations of the protocol pair.

Metcalfe's 3Com has taken the third approach, featuring TCP/IP in an applications software package called Unet that runs under Unix, the operating system developed by Bell Laboratories. Available for a license fee that ranges upward from \$5,000, Unet "provides the capability to simultaneously establish multiple interactive communications links be-

tween different types of computers," according to 3Com.

Xerox Corp. has also named TCP/IP as the basis of protocols it will offer as supplements to Ethernet, which consists of low-level protocols that address much the same functions as the International Standards Organization's High-Level Data Link Control (HDLC) and X.21 protocols [CW, Dec. 21].

According to Metcalfe, 3Com is "an Ethernet company specializing in personal communications," meaning data traffic among workstations and microcomputers in an end-user milieu. Other software vendors, as well as academic research groups, are developing TCP/IP software for IBM; Digital Equipment Corp.; Honeywell, Inc.; Control Data Corp.; and other brands of computer hardware, using the Defense Department's Arpanet. That packet network is itself scheduled for cutover to TCP/IP in January 1983 [CW, Dec. 14].

Sax explained that TCP was developed to replace the Network Control Protocol (NCP), which has run in Arpanet for years. NCP was designed to guarantee delivery of every data packet a user might send through Arpanet, which serves researchers in government, academia and industry.

As Arpanet grew in complexity and volume of usage, subscribers realized no guarantee of this kind was feasible for any large, long-distance pack-

et net, Sax said.

In contrast to NCP, TCP allows the user to lose a packet occasionally — without serious compromising of integrity — in order to improve efficiency of flow and reduce vulnerability to destruction or disruption of links between the sender and receiver. To illustrate this point, Sax said he recently unplugged the link between an HP 3000 and Arpanet, waited five minutes, plugged back in and immediately regained his previous ties.

According to Metcalfe, carriers such as AT&T, Telenet Communications Corp. and Tymnet, Inc. favor the X.25 protocol (which entails HDLC and X.21) because it centralizes control of communications processing, allowing the carrier to dictate how users must package the data they send.

TCP/IP can run with X.25, but as an alternative to that emerging protocol standard (now expected to appear in Bell's Advanced Communications Service), TCP/IP decentralizes control of communications processing, the Ethernet inventor declared. In other words, TCP/IP will give data communications managers many options to consider in packaging data.

These options may allow users to send several times as much data at the same cost, Metcalfe remarked, unless carriers boost tariffs proportionately.

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NFAIS Slates Conference

PHILADELPHIA — Isaac L. Auerbach will deliver the keynote speech at the 24th Conference of the National Federation of Abstracting and Indexing Services (NFAIS), Arlington, Va., March 2-3.

Auerbach, a member of the original design team for Binac and Univac 1, will discuss "The Conflict of Information as a Resource vs. as a Commodity." The conference theme is "Conflict in the Information Environment: Risks and Opportunities."

Session topics include "Sources of Conflict," "New Technology Update" and "International Issues." Following the Miles Conrad Memorial Lecture, a fourth session, "Identification of Risks and Opportunities: What Does This All Mean?", will conclude the conference.

This year's conference is chaired by Ronald L. Wigington, NFAIS' president-elect, chemical abstracts service.

Additional registration information is available from NFAIS, 112 S. 16th St., Philadelphia, Pa. 19102.

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Duties for the Director of Computer Technology and Planning will include development of general architectural and systems engineering specifications for all computing and office automation hardware and systems software including intercenter data networks, development of strategies for implementing and maintaining cost effective computer and office automation capabilities within Lockheed, serving as a central clearinghouse and handling brokerage of computing equipment, development of computer systems security practices, interfacing with divisional management in developing long-range plans.

Both opportunities are senior level positions requiring extensive background and experience with large computer systems. Candidates would normally be expected to have a degree in computer science, business administration or engineering and ten years applicable experience. Advanced degrees desirable.

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Managers on the Move

JAMES E. BAME has been appointed director of technical resources at Columbia Pictures Industries, Inc. He will be responsible for the operation of Columbia's data center in New York City.

Prior to joining Columbia, Bame was director of systems and DP for the Farrel Machinery Group of Emhart Corp. Prior to that he held several positions at Sybron Corp.'s Castle Division, including manager of information systems, and served the Remington Office Equipment Division of Sperry Rand Corp.

ROBERT A. McELROY has been elected vice-president, information management services, at GTE, Inc., Stamford, Conn. He is now responsible for DP, internal telecommunications and office automation functions, as well as information management support at GTE's world headquarters.

McElroy has several years' experience in information management, having worked in DP for such companies as General Telephone Co. in Florida, GTE Telephone Operations, GTE Data Services, Inc., the Bell system, IBM and Macmillan, Inc.

McElroy earned his bachelor's degree from Union College, Schenectady, N.Y.

ROBERT A. BEST has been named vice-president, data systems, at Toyota Motor Sales, U.S.A., Inc. in Torrance, Calif.

Prior to joining Toyota in 1978 as corporate data systems manager, Best served as director of DP for the County of Los Angeles. He was also president of the Los Angeles County Management Council, which represents the management personnel of the 75,000 employees of that county government. He worked for Martin-Marietta Corp. in the areas of engineering, planning and finance before entering the DP field.

A graduate of Franklin and Marshall College, Lancaster, Pa., he has lectured widely on on-line systems and management techniques.

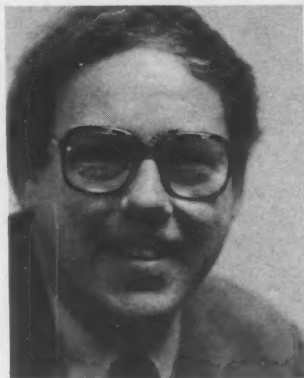
WILLIAM A. SEIBEL has been appointed manager of MIS Air Products and Chemicals, Inc., Allentown, Pa. He will be responsible for planning, implementation and support of the company's Process Systems Group's management information systems.

An Air Products employee since 1975, Seibel had been manager of materials management manufacturing and engineering support prior to this recent appointment.

Seibel holds a B.S. degree in industrial engineering from Pennsylvania State University as well as an M.S. in industrial administration from Carnegie Mellon University.

S. JOSEPH HAREMZA has been named manager of management information systems for Cecos International, Inc., Niagara Falls, N.Y. He will be in charge of reviewing, evaluating and implementing computer systems changes, along with coordinating reports and planning for future systems.

Haremza previously served as manager (Continued on Page 18)



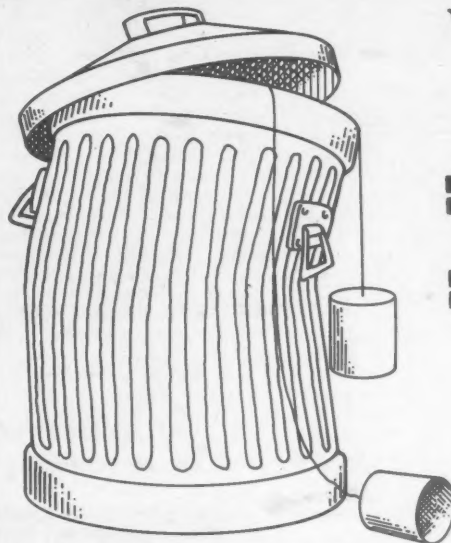
James E. Bame



Robert A. McElroy



Robert A. Best



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You will learn how X.25 can cut your communication costs, increase the capability of your networks, make simultaneous multiple connections and handle speed and code conversion all without additional hardware costs or more leased lines. Other standards, such as X.3, X.28 and X.29, will also be discussed.

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Managers on the Move

(Continued from Page 17)

ager of DP and payroll at Roblin Steel Co., and has held various computer programming positions since. He also works as an independent consultant and a part-time instructor at Erie Community College, Amherst, N.Y.

Haremza holds a bachelor's degree from Canisius College, Buffalo, N.Y.

WILLIAM M. ETHEREDGE has joined The Haskell Co., a Jacksonville, Fla., construction firm, as director of data processing. He will have responsibility for all computer sys-

tems and operations.

Etheredge has more than 10 years experience in the construction industry, and was most recently with Heery International, Inc. in Atlanta.

Etheredge earned a B.S. in architecture at Clemson University, and an M.S. degree in information systems from George Washington University.

BERNARD T. SCHUMACHER has been appointed manager, planning and user services, in the Agricultural Group of American Cyanamid Co.

In his new position, Schumacher will head up long-range systems planning, information services standards, quality assurance, budgets, computer operations and time-sharing services. Prior to joining American Cyanamid, he worked as director of management information systems at Wells Fargo Guard Services.

Schumacher is a graduate of St. Peter's College and received an M.B.A. from Fairleigh Dickinson University.

FRANK ZUCHRISTIAN has been named a vice-president in automated data processing at Security Pacific National Bank in Glendale, Calif.

Zuchristian joined the bank in 1980 and was promoted to assistant vice-president later that same year. In his new post, he will be responsible for delivery systems to Security's 600-office branch banking system.

GILBERT J. JOHNSON JR. has joined Chemplex Co., Rolling Meadows, Ill., as manager of management information systems. In this capacity, he will be responsible for computer applications, systems and operations for the company's facilities in Rolling Meadows and Clinton, Iowa.

Prior to joining Chemplex, Johnson was corporate systems manager, Portec, Inc., Oakbrook, Ill.

After earning a B.S. degree in management, Johnson received an M.B.A. from Western New England College, Springfield, Mass.

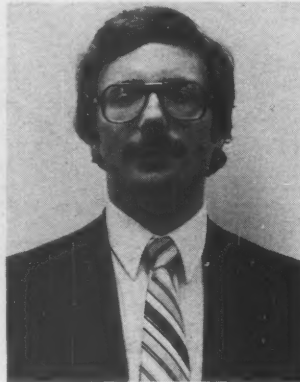
DEAN L. COCHRAN has joined Abbott Laboratories of north Chicago as director, international management information systems.

Prior to joining Abbott, Cochran was area DP manager for the 3M Co. of St. Paul, Minn. He served in a variety of industrial engineering and DP assignments for 3M in Los Angeles and Camerillo, Calif.; Milan, Italy; and Leiden, Holland.

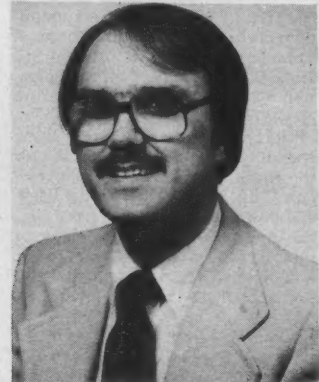
A graduate of Iowa State University of Science and Technology, Cochran received his B.S. in industrial engineering, and was awarded his master's degree in engineering statistics from the University of Southern California, Los Angeles.

THOMAS CARDEN, DONALD DECKER and PAUL KAIGAN have been promoted to positions of vice-presidents in management information systems at American Broadcasting Companies, Inc. (ABC) of New York.

Carden, vice-president of the corporate computer network, joined ABC in 1973 as director of the corporate data centers organization after an extensive career in the financial community. He is an alumnus of Se-



William A. Seibel



S. Joseph Haremza

ton Hall University

Decker came to ABC in 1972 as a project manager in the systems engineering area. He held several senior management positions in this area prior to assuming directorship of the television and radio systems engineering group. Prior to joining ABC, he worked for Western Union, Inc., Virtual Time Sharing, Johnson and Johnson and Republic Aviation.

Kaigan joined ABC in 1970 as a project manager in systems engineering, and held several positions with ABC before assuming the directorship of the technical resources group. He has also worked for Western Union, Union Carbide and General Electric Co.



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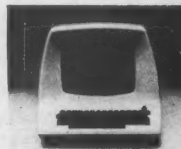
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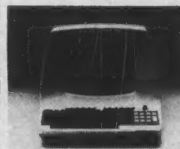
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Employment Service Lists 400 Job Descriptions

ALEXANDRIA, Va. — Career Placement Registry, Inc. has introduced an employment information service that is offered through Dialog Information Services.

The data base used in the service contains 400 occupational descriptions. Upon command, the prospective employer can request a printout with a short resume of all applicants believed to

be qualified for the position.

Job applicants pay a fee of between \$15 and \$40 to register with the service. Employers using the service pay the cost of the computer search. This fee is \$1 per minute of connect time plus \$5 for each full resume requested.

The Career Placement Registry is based at 302 Swann Ave., Alexandria, Va. 22301.

On-Line Data Base Service Helps Match Employers to Employees

NEW YORK — A computer-based job hunting service with a data base containing resumes and career information was introduced by Careersystem, Inc. here recently.

Careersystem, an on-line service, allows job candidates and employers to scan the company's data base for suitable job matches through connected CRT terminals.

The system is targeted toward job seekers in technical, managerial and professional areas, the firm said.

According to Linda Strand, vice-president of technical services for Careersystem, communication with the system is achieved via standard telephone lease lines with data transmitted asynchronously or bisynchronously to Careersystem's Tandem Computers, Inc. T16 CPU on the West Coast. Future plans are to include satellite and microwave communications. Strand noted that most major CRT terminals currently on the market can be used on the system.

The system can be used by subscribers (job seekers) or users (such as employers, counselors and recruiters). Subscribers fill out a Data-pack with information concerning job history, aspirations, location preference, skills, experience and so forth, which is then stored in the central data base.

They then choose from four levels of participation that include information (receipt of a laser-printed hard-copy resume, career planning and job market data), priority (seeking immediate employment), confidential (interest in anonymously reviewing opportunities) and executive (jobs at \$50,000 plus).

A subscriber periodically receives data on salary surveys and market bulletins compiled from the information stored. The subscriber's resume can also be amended if desired, the firm noted.

The employer or user can view what is stored on the CRT terminal and, if interested in a candidate, can then instruct Careersystem to contact the subscriber.

A subscriber can get on the system at an introductory price of \$49.50 (\$89.50 thereafter) from Careersystem, Inc., P.O. Box 3097, Palm Beach, Fla. 33480.

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Correction

The name of the author of "Why Buy? Researchers Outline Guidelines" in the Jan. 25 Special Report on applications packages was unintentionally omitted. Raymond P. Wenig, president of International Management Services, Inc., wrote the article for use in Auerbach Publishers, Inc.'s Systems Development Management service.

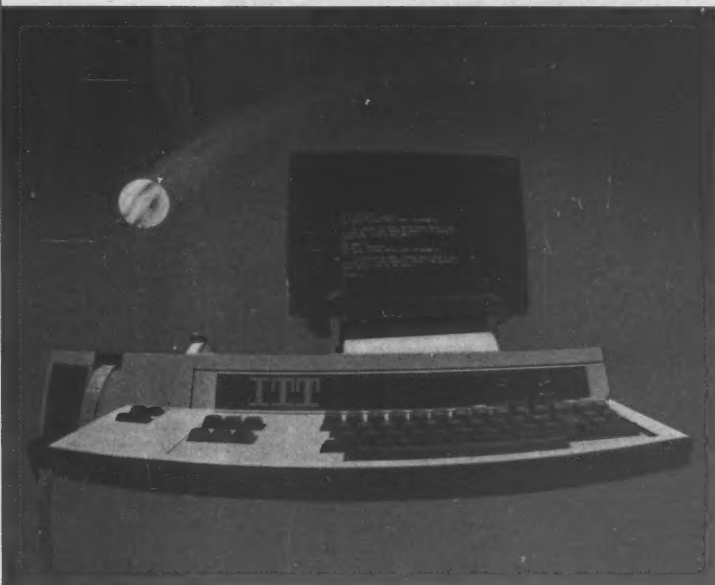
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Packaged Software Clamps Valve Shut on Costs

DETROIT — The decision to buy software for the De-Sta-Co Division of Dover Corp. here was motivated by one factor — savings.

"We have no doubt that developing our own software would have cost at least 10 times as much," the firm's president, Tom Reece, said.

Two years ago the company decided it was time to computerize. The firm manufactures valve, stamping and in-

dustrial products. Having no data processing staff or background, its management hired manufacturing consultants Ernst & Whinney to assess its requirements and recommend solutions.

"A thorough study of our operations revealed that as a manufacturer we had no unique requirements," Reece said. "With this information, Ernst & Whinney felt that packaged software would

suit our needs."

"We developed a very detailed list of our requirements and began a nine-month investigation of state-of-the-art system solutions that were available."

Ten software vendors were considered.

Of these, five were hardware manufacturers with packages and five were software vendors. The vendor that was chosen was Systems

Management, Inc. (SMI) of Rosemont, Ill.

The reasons were threefold: "Their software most closely fit our requirements (thus, fewer modifications); their software was the least expensive; and their software best suited our present and future needs," Reece explained.

The hardware chosen, through SMI, was the Honeywell, Inc. Ultimate Series D. Initial emphasis was

placed on getting SMI's Manufacturing Control System (MCS) up and running, starting with inventory control.

From there, the company continued adding applications from MCS and SMI's distribution/accounting package, which interfaces with MCS.

"As applications were added, we utilized a company account called 'test company' so as not to affect live data," Reece said. "This account not only allows for experimentation, but also enables us to train personnel on the system."

"Now, a year-and-a-half later, we find we have had some welcome surprises with our system. The dollars we have spent for modifications have been marginal. In fact, actual expenditures have been about 50% of what we anticipated," he continued.

More Capabilities

In addition, the system offers more capabilities than were initially recognized, he said. "We find we are using features of the system we considered unnecessary. In many instances, we made slight modifications to our own internal structure rather than the system."

"Another decision we made at the outset — not to buy source code — has proven very beneficial. We have not had to hire any data processing personnel — a welcome relief in a highly competitive marketplace," Reece added. Instead, the company has a technical service contract from SMI.

"To us at De-Sta-Co, there is no question as to which way to go when considering computerization. Packaged software is the answer," Reece said. "Just be sure to do your homework when selecting and implementing a computer system. The question of which packaged software is best answered by carefully considering your requirements and then finding the vendor who offers the right package backed by service and support."

Before the Northrop F-5G gets off the ground, it has to fly on a Harris computer.

Northrop's high performance F-5 tactical fighters are the most widely deployed fighter aircraft in the free world. A refined version of the F-5, the F-5G "Tigershark," will be delivered in 1983.

A pair of Harris 800 computers, in concert with twelve other Harris computers, are playing a key role in the development of this aircraft by driving Northrop's two development simulators, as well as being used for interactive

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Cambridge, MA March 2	Los Angeles, CA March 5	Pittsburgh, PA March 2
Charlotte, NC March 30	Louisville, KY March 2	Portland, OR February 24
Columbus, OH April 12	Milwaukee, WI April 14	Raleigh, NC March 11
Costa Mesa, CA March 11	Minneapolis, MN April 13	Roanoke, VA March 16
Dallas, TX March 25	New Orleans, LA March 4	Rochester, NY February 25
Dearborn, MI March 25	New York, NY March 11	Salt Lake City, UT March 23
Denver, CO March 16	Oak Brook, IL March 12	San Mateo, CA March 25
Des Moines, IA April 6	Oak Brook, IL April 8	Seattle, WA February 23
Honolulu, HI April 8	Oklahoma City, OK March 18	Secaucus, NJ March 9
Houston, TX April 8	Omaha, NE March 30	St. Louis, MO April 7
Indianapolis, IN March 10		Washington, DC March 16

International Seminars

Adelaide, Australia March 4	London, England February 25
Amsterdam, Netherlands March 10	Lyon, France March 25
Antwerp, Belgium March 11	Manila, Philippines April 1
Birmingham, England February 23	Melbourne, Australia February 25
Brisbane, Australia February 18	Montreal, Quebec, Canada April 6
Brussels, Belgium March 16	Oslo, Norway February 1
Calgary, Alberta, Canada May 12	Ottawa, Ontario, Canada March 9
Canberra, Australia February 23	Paris, France March 24
Dublin, Ireland April 15	Perth, Australia March 2
Geneva, Switzerland March 30	Singapore March 25
Glasgow, Scotland February 17	Sydney, Australia February 16
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Disgruntled Users Filing Suits Legal Pros Told to Acquire DP Savvy

By Lois Paul
CW Staff

NEW YORK — The proliferation of computer software packages will increase computer-related litigation from dissatisfied first-time users, and the legal profession must learn enough about the computer industry to handle the expected influx.

These were some of the messages offered to approximately 550 lawyers at a recent standing-room-only meeting of the Association of the Bar of the City of New

York.

The seminar, which was entitled "Computers, Software and the Law: The Next Five Years," reportedly drew the biggest crowd since the Association's annual Twelfth Night entertainment program.

Esther Schachter, chairwoman of the Special Committee on Computer Law of the Association of the Bar — which sponsored the forum — said the notices of the meeting spread much further than the members of the Association of the Bar.

Assessing the Future

Because this was the first forum of the committee, which was established in fall 1980, it was decided to provide a broad overview. The theme was to make an assessment of what the future is going to look like, she said, adding that an annual update may be in order.

"I think what you are going to see happen more now is that the law firms themselves will recognize this as an important segment of business," Schachter said. "I think we are going to form a bar, a segment of the profession that is a recognized specialization."

The implications of the growth of the computer industry for the legal profession can be seen just in the fact that 550 lawyers decided to come out "on a cold winter night" to learn more about it, she said.

"I think the association itself is definitely showing a recognition of the area of computers as being an important one and one that we are going to be active in," she said.

The panel of speakers consisted of members of the bar's special committee who are considered experts in the field of computer law. Some of their topics included trade-secret law, property rights and software, copyright protection for software, the copyright act, computer contracting and hardware and software services.

A general background on computers was provided by Oscar H. Schachter, executive vice-president and general counsel for Advanced Computer Techniques Corp., who discussed the legal implications of the growth of technology.

"The whole question of the proliferation of software [for] nontechnical people has raised a host of problems

with regard to legal suits," Oscar Schachter explained, "because nontechnical people expect to get systems that work as soon as they turn them on. Until the software and hardware stabilizes, expect to see a lot more litigation."

More User Dissatisfaction

Joseph P. Zammit, of the New York law firm Reavis & McGrath, further developed Oscar Schachter's theme. "As a consequence of the dramatic drop in the cost of processing power and the resultant expansion of the market for computers, the potential for individual cases of user dissatisfaction is constantly growing.

"Add to this an increasing level of consumer expectation [often fueled by the vendors themselves] and a decreasing willingness to accept excuses couched in scientific mumbo jumbo, and what you have is the prospect of an enormous amount of litigation," he said.

Zammit speculated that most complaints in the future will be related to software, rather than hardware, and will center on the failure to meet the needs of a particular user rather than on the total inability of a computer system to work.

Bar Responsibility

"In the face of this prospective eruption of litigation, the bar has a responsibility to become sufficiently knowledgeable about the technology and the industry to effectively represent its clients

in this area," Zammit said. "Lawyers will have to overcome what seems like their innate distrust and aversion for technical matters."

He maintained that the technical and factual complexity of these cases argues in favor of specialization similar to that which has developed in areas such as medical malpractice and aircraft litigation.

Zammit stressed the importance of the contract in clearly defining the relationship between vendor and user.

Addressing the topic of contracts, Esther Schachter predicted that over the next five years contracts for hardware and software will not change dramatically from business to business (vendors dealing with business organizations). However, the consumer area will change dramatically.

Naive Users

Problems seem to have arisen because of naive users who do not really understand what they are buying, Schachter said. This has led to a lot of litigation from disappointed first-time users and it is going to increase.

At the same time, she predicted that through education about the computer industry and increased awareness, first-time users will consider getting computer law specialists to help them draw up contracts.

"People are becoming more sophisticated, at least in terms of knowing when to get help."

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N.Y.C. Subways, Buses Get \$12 Million Repair System

NEW YORK — A computerized system designed to speed repairs and maintenance on New York City's subway and bus systems was introduced by the New York City Transit Authority (TA) here recently.

Coming on the heels of recent criticism about the general disrepair of subway cars and buses, the TA said that its new \$12.1 million system will enable it to identify and distribute needed mechanical parts to depots around the city for quicker repairs.

Parts, Inventory

According to a TA spokesman, workers in the system's maintenance garages and depots fill out a daily report that lists needed parts. The information is then key-punched producing cards that are input to an IBM System/38 minicomputer.

The card input is being initially used until the system is completely installed at which time it will include nearly 50 on-line terminals throughout the TA's maintenance network, the spokesman said.

In addition to keeping track of parts and inventory, the system will record general

ledger transactions for accounting and budget purposes, he explained.

All of the data collected will be stored in the System/38 and be available for on-line review by the central inventory department to be used for reordering parts and keeping inventory. The spokesman said that this should dramatically speed up the time it takes for workers to get parts for ailing cars. "The system will enable us to have a minimal stock loss at any one time," he said.

Better Tabs

The system will also allow the TA to keep better tabs on its workers and the time it takes them to complete certain maintenance jobs, the TA explained. It will also provide mechanical histories for individual cars so workers can more easily track down problems.

The TA said that it expects the project to be fully operational some time in June and that it is currently training workers around the clock. In a recent interview, TA President John D. Simpson said that "With the system, rapid-transit maintenance takes a major step into the future."

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V1100 CRT DEscope	1,895	162	90	61
V1101 CRT DEscope	1,185	115	67	43
V1125 CRT Graphics	3,200	315	185	119
V1131 CRT DEscope	1,145	167	98	63
V1132 CRT DEscope	1,995	180	106	72
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T1705 Bubble Memory Terminal	2,295	249	136	93
T1 Inflight 10 Terminal	895	67	37	25
T1785 Portable KSR, 120 CPS	2,390	230	128	86
T1787 Portable KSR, 120 CPS	2,445	273	152	102
T1810 RD Printer	1,600	162	90	61
T1820 KSR Printer	2,195	211	117	80
ADMSA CRT Terminal	995	57	34	22
ADMS CRT Terminal	845	52	36	24
ADMS2 CRT Terminal	1,165	112	65	42
ADMS4 CRT Terminal	1,990	190	106	72
EXCEL 12 CRT Terminal	1,895	162	90	61
EXCEL 42 Smart Buffered CRT	995	95	53	96
COLORSCAN 10 Color CRT	3,195	307	171	118
820 CRT Terminal	850	82	46	31
900 CRT Terminal	1,075	103	57	39
Letter Quality, 7715 RD	2,895	278	156	104
Letter Quality, 7725 KSR	3,295	318	175	119
2630 KSR Printer 30 CPS	1,195	115	67	43
2120 KSR Printer 120 CPS	2,195	211	117	80
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The detachables offer extra memory and accept an extra board for speech, graphics, modems, controllers or additional memory. Options include 15" screens and a convenient tilt mechanism.

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The art of sculpting marble has been described as a process where one starts with a block of marble, then removes everything that is not art.

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System (AOS/RT32) such a thing of beauty.

With AOS/RT32, you use a flexible, interactive system generation utility to define the system, the processes, the files. And all the priorities.

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As a matter of fact, you not only determine exactly how fast things will happen. You also determine exactly when they will happen. So you're guaranteed maximum interrupt latency.

Believe it or not, this is not the way most Real-Time Systems work.

Most Real-Time systems are modified timesharing systems.

AOS/RT32 on the other hand, was conceived from the beginning as a Real-Time System.

This is not to say that we are in any way opposed to timesharing sys-



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tems. In point of fact, we have given you one of the best timesharing systems in the business to develop your

Real-Time code: Our Advanced Operating System/Virtual Storage (AOS/VS). It's a compatible superset of AOS/RT32

that provides an incredibly lush environment for programming in FORTRAN 77, PL/I, DG/L™ software and Macroassembler. And has an ability to run (and consequently, debug) your Real-Time code while working in a time-sharing mode.

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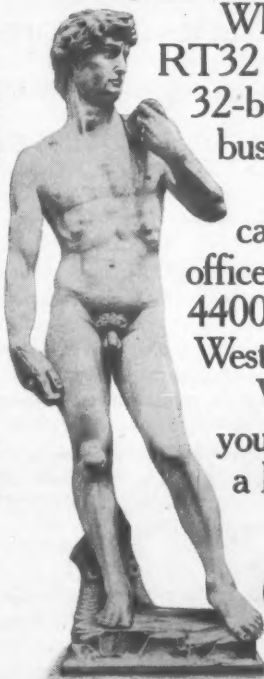
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We'll send you exactly what you need to know to sculpt a Real-Time masterpiece.



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Larry Long's List of Professional Societies

• ASSOCIATION OF COMPUTER USERS (ACU)

Purpose and Objectives: The primary objective of ACU is to provide its members with user-oriented information about the many systems choices available to them. The ACU was formed in early 1979 by merging the Association of Time-Sharing Users and the Association of Small Computer Users; both are now sections of ACU with their own elected officers.

At the time of the merger, five additional sections were formed, and each has its own newsletter today: midi computer section, large computer section, word processing section, distributed processing section and home and hobbyist section.

The ACU also publishes the "Benchmark Reports," which compare small- to mid-size computer systems and ACU's journal, "Interactive Computing."

For More Information: Hillel Segal, President, Association of Computer Users, 4800 Riverbend Road, P.O. Box 9003, Boulder, Colo. 80301.

• ASSOCIATION FOR COMPUTING MACHINERY (ACM)

Purpose and Objectives: An educational and scientific society for computing professionals, ACM was founded in 1947 for people deeply interested in computing — its implications and applications. The association is dedicated to furthering the professionalism of its members in a diversity of related disciplines.

ACM's activities include committees set up to solve specific problems, groups formed to pursue special interests, meetings held at national and regional levels, lectures and educational programs, technical publications to disseminate research and long-term commitments to promote the use of computers in the best interests of society. ACM has 32 special interest groups. The formal purposes of ACM are:

1. To advance the sciences and arts of information processing including, but not restricted to, the study, design, development, construction and application of modern technology, computing techniques and appropriate languages for general information processing, storage, retrieval, transmission/communication and processing of data of all kinds. Also for the automatic control and simulation of processes.
2. To promote the free interchange of information about the sciences and arts of information processing both among specialists and the public in the best scientific and professional tradition.
3. To develop and maintain the integrity and competence of individuals engaged in the practice of information processing.

For More Information: Association for Computing Machinery, 1133 Ave. of the Americas, New York, N.Y. 10036.

• COLLEGE AND UNIVERSITY MACHINE RECORDS CONFERENCE (CUMREC)

Purpose and Objectives: Cumrec '81 will mark the 26th anniversary of the conference. The first Machine Records Conference, attended by 64 people representing 37 schools and two firms, was held at Michigan State

University in May 1956. The conference was organized to exchange ideas and information related to data

Larry Long is compiling a list of professional DP/Computer societies and organizations. To be included, societies and organizations should send a brief description of their purposes and objectives to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

processing in higher education.

The first conference was not intended to be the start of another national organization, but there was soon evidence of enough interest to justify a national conference. There

was no formal organization until 1972, at which time Cumrec was established. Cumrec is a nonprofit corporation of the State of Michigan governed by an elected Board of Directors.

For More Information: Albert L. LeDuc Jr., 11011 S.W. 104 St., Miami, Fla. 33176.

• EDP AUDITORS ASSOCIATION (EDPAA)

Purpose and Objectives: The association's primary objective is to assist its membership in attaining a high degree of education and experience in addressing DP systems control problems and developing methods and techniques for establishing controls. Members are offered a program that:

1. Helps establish professional recognition for DP auditing specialists.

2. Provides local, regional and international forums for exchanging information regarding controls, standards, audit techniques, audit and management philosophies and training.

3. Develops DP audit and control standards through publication and distribution of the control objectives.

4. Provides the means for communicating to management and data processing professionals the importance of controls necessary to ensure an effective organization and use of data processing resources.

For More Information: EDP Auditors Association, 373 S. Schmale Road, Carol Stream, Ill. 60187.

THE LEADING EDGE

#2 in a series of reports on new technology from Xerox

Few inventions have proved more versatile than the laser.

It has been used as a super signal lamp for space communications. It has found a role in exotic metal-working applications, and the incredible precision that it offers has made new kinds of brain and eye surgery possible.

A system for playing TV shows from phonograph-like disks uses a laser to "read" the recorded program material.

Lasers are used in various forms of measurement and information handling systems. For example, one version of the bar-code reader used in supermarkets employs a laser scanner.

The Hologon Laser Scanner is one of the latest developments in practical applications of laser technology. It was invented by Xerox optical physicist Dr. Charles Kramer who wrote this article.

Lasers In Electronic Printing

At Xerox we use lasers in electronic printing systems that are based on xerography. Instead of making copies of existing documents, such printers create documents, drawing on information stored in a computer. In such a system, signals from the computer pulse the laser beam as it scans across a light-sensitive drum or belt that serves as the "camera film" in xerography. The image recorded in this way is then developed and transferred to

paper as in a copier.

Laser electronic printers offer the quality of offset printing with significant versatility compared with conventional computer printers. There is virtually no meaningful limit to format or to type style or size. Pictorial or other graphic material can be printed as easily as text. Arabic, Greek or Russian alphabets—even Oriental ideograms—are within its capabilities, provided appropriate programming is fed into the printing system.

Equally significant is the fact that, with electronic printing, documents originated in one location can be printed simultaneously at a number of different locations.

Xerox currently offers three such systems. The 9700 electronic printing system turns out almost two pages per second and has almost unlimited flexibility when it is used with the Xerox Integrated Composition System program. The 5700 electronic printing system is up to 40 times faster than conventional word-processing printers, which it can replace, and it can also be used for electronic mail and remote computer printing. A similar printer is offered as part of the Xerox 8000 network system. Designed for lower-volume applications, it is twelve times faster than a conventional word-processing printer.

In these printers, the scanning action of the laser beam is created by a relatively complex opti-

Is Company Over Its Head in DDP?

Q Our DP division is now centralized, but a board-level decision has been made to go to distributed data processing. I, along with seven other plant managers, will be responsible for our own DP departments. Our DP people have been very patient in their attempts to explain distributed data processing.

I'm not alone in my feelings that we are getting in above our heads. Some DP people feel this way also. I'm not resisting the move, I just wonder if we're moving too fast.

A Distributed data processing, or DDP, is another of those often used terms that has no common meaning and, therefore, is

easily misinterpreted by users and management information systems professionals. This often leaves unresolved the questions of what to distribute and what degree of distribution would best serve the needs of the company. I/O, processing, data storage, personnel (including management), audit and control and planning can all be distributed to some degree or another; ask that these issues be resolved now.

Once you have a handle on exactly what is going to be distributed and how it is going to be accomplished, you and your colleagues should feel more comfortable with the move.

Usually managers faced with a similar transition of DP operations and philosophy board one of three ships:

the "Resistance", the "Cautious Optimism" or the "Good Ship Lollipop". It appears that your attitude will buy you a ticket on "Cautious Optimism" and possibly success.

Q We have a small shop with one analyst and two programmers. We work well together, and each of us is involved in the maintenance and development of all of our systems. Is it possible to organize as chief programmer teams with only two programmers?

A That concept is most effective with teams of three to five programmers; however, you can realize some of the benefits with two-person teams. These bene-

Turnaround Time

By Larry E. Long



fits include encouraging a modular approach to program development and having a clear definition of programming project responsibility.

In your case, programmer A could be the chief programmer on some teams and programmer B on others. This organization is effective even if one programmer is substantially junior to the other.

Q I'm looking for information on producing usable standards and procedures manuals for DPs. Are there any companies out there willing to share sample manuals?

A Given the opportunity, companies are more than willing to share their material and experiences with others. Some enterprising champion of quality DP-related manuals should establish the "DP Manual-Sharing Society."

I invite representatives from those companies in your state — Indiana — who are willing to share their DP manuals and experience to write me. I will route all responses to your attention.

Q How can I go from a job as an operator with 10 years' experience and some exposure to programming (about one and a half years collectively) to a job as a programmer, with education (two-year DP diploma, 1971) and experience considered? In addition, I have a wife, four children and one due now. How might I brush up on my programming in order to get a job? Is there a home correspondence course available?

A Because of the current demand for programmers, your substantial operations experience, your spotty and probably rusty programming "exposure" and your DP diploma comprise sufficient credentials to obtain a programming position. Many small shops would welcome your ability to switch-hit and offer some on-the-job programming training until you can carry your load as a production programmer.

Before you distribute your resume, investigate the possibility of an in-house move to programming. Management might be receptive to your using company materials, computers, expertise and your own time to develop your programming skills. Your vendor representative and programming manager can recommend appropriate books and self-paced courses.

Long is a professor at Lehigh University, a DP consultant and author. If you have a question you'd like him to address, send it to Larry Long, Editorial Department, Computerworld, P.O. Box 880, Framingham, Mass. 01701.

cal system that is based on a rotating, polygonal prism. Extremely high precision is required in such a system. This complexity and precision make such a laser scanner relatively expensive.

The Hologon Laser Scanner

To simplify laser scanners and reduce their cost, we considered holography to perform the functions of costly lenses and prisms.

Holographic recordings, best known for their reproduction of three-dimensional images, take the form of gratings—corrugated or ridged patterns on a transparent medium, having a spacing of approximately twenty millionths of an inch. In pictorial holograms, these gratings contain the recorded cross section of the wavefront of light

novel configuration.

In a Hologon, a series of holographic gratings are formed around the circumference of a transparent disk. A laser shines through these gratings as the disk rotates. The gratings diffract the laser light, and the rotating action causes it to scan across the surface on which it is focused, as shown in the accompanying diagram. Focusing is done by a simple, inexpensive lens.

The laser beam in this system is aimed so that it forms a nominal 45° angle to the Hologon's surface as it enters a grating and a 45° angle as it emerges from the grating. In other words, it is diffracted through a right angle by the gratings. This angling results in a straight-line scan.

Because of the optical properties of the holographic gratings, the 90° diffraction angle of the beam is maintained even if the Hologon surface wobbles as it rotates. The beam angle is equally unaffected by eccentricities in the rotating disk.

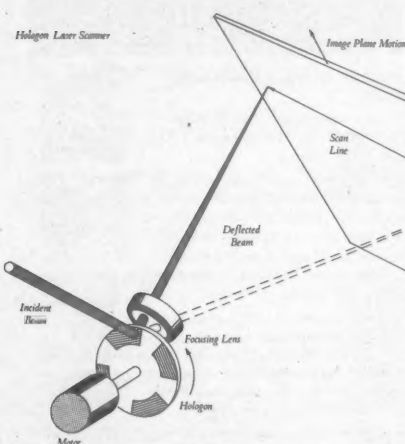
This insensitivity to mechanical variation, plus the ease and low cost with which Hologon disks can be produced, make a Hologon laser scanning system relatively inexpensive.

Work is currently underway at Xerox on a new generation of laser printing systems utilizing the Hologon laser scanner with all its attendant benefits. This should enable Xerox to make the advantages of electronic printing more widely available than ever before.

About The Author

Dr. Charles Kramer is the inventor of the Hologon Laser Scanner. He is an optical physicist specializing in electro-optical reading and printing devices at the Xerox Joseph C. Wilson Center for Technology in Rochester, New York.

He holds a Bachelor's degree and a Master's degree in Physics from Fairleigh Dickinson University and a Master's degree and Ph.D in Optics from the University of Rochester.



that had been reflected from the pictorial subject. When coherent light—usually from a laser—is transmitted through such a hologram, a true three-dimensional image of the subject is reproduced.

However, the holographic gratings used in a Hologon scanning system do not contain pictorial information. Only the optical diffraction properties of the gratings are utilized.

The Hologon System is one of several holographic approaches to scanning. But the others tend to scan in an arc-like pattern which is unsuitable for electronic printing, which requires a straight-line scan, much like the raster pattern used in television to create an image. The Hologon approach gets around this problem through a

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COMPUTERWEEK Schedule of Events March 2 - 5, 1982

Productivity & Information Systems Planning

"Strategic Management of EDP Resources" John M. Thompson, Vice President, Index Systems

"EDP Economics and Software/Organizational Productivity" Werner Frank, Executive VP, Informatics, Inc.

"Case History in MIS Productivity Improvement" Daniel Merrell, Manager, Productivity and Technical Training, Union Carbide Corporation

"Applying 'Theory Z': A Case History in Implementing Japanese Management Techniques in the U.S. Computer Industry" John Rehfeld, VP and General Manager, Toshiba America, Inc., Information Processing Systems Division

"Data Processing Management's Role in Office Automation" Walter E. Ulrich, President, Walter E. Ulrich Associates

Hardware & Capacity Planning

"Performance Modeling" Barry Stevens, VP, Performance Management Associates

"Software Engineering in the Productivity Environment" Ken Kolence, President, Institute for Software Engineering

"Reducing System Definition-Development Lifecycle Costs" Gopal K. Kapur, President, Kapur & Associates, Inc.

Human Resources

"The Personnel Crunch in Data Processing" Harold S. Bott, Partner, Arthur Anderson & Company

"The Programmer Gravy Train Derails" Charlene Franci, Consultant, Quality Assurance, Security Pacific National Bank, with Thomas J. Franci, Director, Information Services, The Bekins Co.



Telecommunications & Distributed Processing

"New Application Opportunities in Telecommunications" Professor Leonard Kleinrock, School of Engineering & Applied Science, University of California at Los Angeles

"Social and Economic Impact of Telecommunications" Dean Gillette, Executive Director, Corporate Studies, Bell Laboratories

"Using Non-IBM Systems in SNA Environments" Saroj K. Kar, President, Telcom Computer Technology International

"Future of the SNA Applications Environment" John King, President, 3K Group

Software Development & User Applications

"Improving Programming and Programmer Productivity" Jack E. Ewers, Manager, Systems & Programming, Honeywell, Inc.

"Engineering Fourth Generation Software Products and User Applications" Martin Goetz, Senior Vice President, Applied Data Research, Inc., Director, Software Products Division

"Productivity Leverage Through System Utilities" Asa Lanum, Vice President/Advanced Development, Pansophic Systems

"Higher Level Languages: Status, Prospects & Payoffs" Jim Wilcox, VP, Heneco, Inc.

Software Strategy

"IBM Software Strategy for the 1980's" Robert Cook, VP, VM Software

"Large Processor Architecture Trends" Bryant Jeffries, Strategic, Inc.

"Guaranteed Systems: Applications Development Through Hardware Concepts" Dan Nolan, Deputy Director, Business Data Processing, Computer Sciences Corporation, Systems Division

"Survivable Systems" Dr. W.H. Highleyman, President, Sombers Associates, Inc.

Database

"Strategies & Implementation of the Corporate Data Base" Leo Cohen, President, Performance Development Corporation

"Data Structured Design for Distributed Data Processing" Hugh W. Ryan, Arthur Anderson & Company

"Mainstream Choices In Database" Charles Bachmann, Vice President, Cullinane Data Base Systems

Market Opportunities

"Future of the PCM Mainframe Vendors" Duane Kirkpatrick, Partner, Robertson, Coleman, Stephens & Woodman

"Telecommunications: The Bridge Between Word and Data Processing" Walt G. Frederickson, Vice President, Technology, Harris Corp.

"Local Networks: Planning For Maximum Application Potential" Frank Dzubeck, President, Communications Network Architects, Inc.

"Have You Missed The Venture Capital Boom?" Roy Rogers, Partner, Hambrecht & Quist

"Measuring And Improving Programmer Productivity" Girish Parikh, President, Shetal Enterprises

"Why Management Hates DP (And What To Do About It)" Walter Lankau, Vice President, Management Decision Systems

"How to Cut Support Costs with Professional Documentation" Stephanie Rosenbaum, President, Tech-Ed

"Concepts and Trends in Information and Data Resource Management" Steven H. Spewak, Vice President, Performance Development Corp.

March 3 & 4, 1982



"The Economic Outlook for the OEM...Boom or Gloom?" Chairperson: Adolf "Sonny" Monosson, Chairman, American Computer Group, Inc.



"Japanese Vendors Meet the Press" Chairperson: Peter Bochner, Los Angeles Bureau Chief, Computer Business News



"The Vertical Marketing Survival Guide" Chairperson: Lawrence D. Dietz, MBA, JD, President, The Alec Group



"Complex Legal Issues Affecting The OEM" Chairperson: Richard Raysman, Attorney, Brown & Raysman, and Contributing Columnist, Computer Business News and Peter Vogel, Attorney, Peter S. Vogel, P.C.



"The OEM Market Analyst ... A Look to the Future" Chairperson: Tom Casalegno, Vice President, Publisher, Computer Business News



"Retail Takes on a New Meaning for the OEM" Chairperson: Deborah de Peyster, East Coast Bureau Chief, Computer Business News



"The European Market ... How to Break In Successfully" Christopher G. Codrington, Managing Director, Interco Business Consultants Ltd.



"OEM Technology...An Intense Overview" Chairperson: Vic Farmer, Editor, Computer Business News



"Survival Tools in the 80's" Chairperson: Richard C. Cole, President, Computer Results, Inc. and Michael R. Wood, Partner, Andreoli, Johanson & Wood



"Marketing Strategy: Tools To Ensure Continued High Profit" Jack M. Keen, Director, Management Products, INPUT



"The Independent Software Business Vendor" Chairperson: Rory O'Connor, Senior Editor, Software, Computer Business News



"Taxes ... The Software State Tax Issues" Rory O'Connor, Senior Editor, Software, Computer Business News

"Fortune 500 Manufacturers...As OEM Opportunities" Neil Kleinman, International Data Corp.

Other Topics of Interest

"Software...The State of the Art" • "Software for the Vertical Marketplace" • "The Local Network Avalanche" • "Financial, Banks and Insurance Companies...As OEM Opportunities" • "The Process Control Industry...As An OEM Opportunity"

March 5, 1982 — Desk-Top/Personal Computer Day

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"How to Choose A Vendor for Corporate Micros"

"Choosing the Right Computer for You: Analyzing Your Needs and Cost/Performance"

"Market for Personal Computers"

"After 'Visicalc,' What?" Daniel S. Bricklin, Chairman of the Board, Software Arts

"The Personal Computer: Tomorrow's Business Tool, Today!" H.E. James Finke, President, Commodore International Ltd.



"Can Personal Computers Break Users' Application Logjam?" Kenneth A. Parker, President, Executec Corp.

Afternoon Sessions

Each hour, from 2:00 p.m. to 5:00 p.m., there will be five concurrent sessions. You can choose from the following topics:

"DDP with Micros" • "The Executive Work Station" • "CP/M as Vendors View It" • "Legal Office Applications" • "The Classroom of the Future"

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Boosts Efficiency

Loan System Keeps Mortgage Firm Competing

DALLAS — To meet the intense competition for residential mortgages the Murray Investment Co. here installed a new mortgage loan control system.

The package, the Mortgage Lending Control System (MLCS), was developed by Symbolics Financial Systems, Inc. and is built around an

IBM Series/1 computer. It enables the firm to produce closing documents at a fast rate, at less cost and with a higher level of accuracy than ever before, according to its president, John Roach.

"This gives us the ability to track our loans-in-process and reduces the risks involved in volatile interest-

rate markets both in filling GNMA [Government National Mortgage Association] commitments and controlling our position on guaranteed loans in process. This all adds up to a substantial improvement in our management control, in our responsiveness and in the quality of our services," he explained.

Previously, the firm had used a minicomputer-based system. "Due to the continuous changes in loan closing documentation requirements, we had to turn to the vendor for almost everything, and the vendor's support was simply not adequate," according to Ross Anderson, senior vice-president of operations.

In the fall of 1978, the company began the search for a better solution and placed the initial emphasis on equipment. Vendor service was a prime consideration in the evaluation. A second factor was growth. The firm wanted a system that would be expandable and adaptable in the future. Finally, there was a need for "compatibility" with the large IBM computer equipment used by the parent company, Murray Financial Corp.

Next Step

According to C.J. Smith, vice-president and controller of Murray Financial and corporate director of DP, "Once a mortgage loan closes, the next step is to set up the new loan on our servicing system. Much of the basic data on a loan is already stored in the computer that produced the closing documents. We wanted to automatically move that data over to our servicing system on the corporate computer and eliminate a redundant data entry operation." With these criteria in mind, it chose the IBM Series/1 system.

The next big question was how to get the software to perform the processing on a Series/1. The company had no computer development staff of its own, the parent company's programmers were occupied with other matters and a review of the software catalogs for suitable packages revealed a void of likely candidates. The firm then heard about Symbolics Financial Systems, which specialized in Series/1 software.

Symbolics Financial Systems had marketing rights to a software package — CDPS — developed by Tominy, Inc., which produces programs that are portable across various computers. The intent was to market CDPS to Series/1 users.

However, Murray Investment wanted more than just CDPS; it wanted the application solution also. Murray Investment received the benefits of a new system and Symbolics Financial Systems created a new product, MLCS.

At Murray Investment, the MLCS system operates on an IBM Series/1 with 128,000 positions of memory. Attached to the Series/1 central processor are disk units that store up to 78 million characters of data, a line printer, a typewriter/printer and four CRT (or video) terminals. The Series/1 configuration actually required for MLCS depends upon the volumes of loans-in-process, the desired peak-load of closings per day and so on.

MLCS activity commences when a loan application is received. Using CRT terminals, a data entry operator in the processing department enters the new application into the MLCS data base. At this point, certain data is available: application number, description of the property, name of the purchaser and so on.

Several steps must be accomplished to move loans through the processing "pipeline" to closing. As these steps are completed, the results are entered (via CRT) into the loan applications records housed in the MLCS data base. All loans-in-process records always reflect an up-to-date status, and data on any individual

loan is instantaneously accessible through display on a CRT terminal.

MLCS produces several reports from the loans-in-process file and in combination with two other files — the investor commitment file and the producer file. Certain reports are designed to provide management with decision-making information on a variety of subjects. Also produced is a loan application register that contains the information needed to respond to federal audits.

When a loan is ready for closing, the first requirement is to update the loan record with all of the final closing information.

The next step in the closing phase is document preparation. The MLCS system contains complete master information on the documents needed for the various types of residential loans. The data entry operator keys in the category of loan on a CRT. MLCS responds with a "prompting" screen that lists the various documents normally produced for that type of loan.

MLCS programs control the horizontal spacing, vertical line movement and so on. When a form is completed, the operator removes it from the typewriter/printer, selects the next document from the CRT and inserts the next form into the typewriter/printer. MLCS keeps track of which documents have been printed to ensure that none are omitted.

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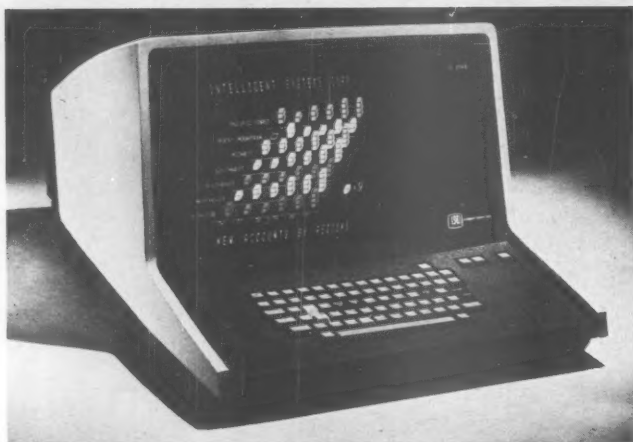
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IS-2048: Full-featured, commercial-quality color graphics terminal

The Right Product, At the Right Time The Demand of Current Economic Conditions

The IS-2048 couldn't have come at a better time. Both hardware and software systems houses need new and enhanced products to attract new customers and to increase sales to their existing customer base.

Now, thanks to the highly competitive price of the IS-2048, these manufacturers can immediately offer their customers the advantages of color graphics, and at a price comparable to a good black and white terminal.

"Our customers' products sell more quickly and with better margins when they feature color graphic displays," explains Paul R. McGraw, Director of OEM Sales for Intelligent Systems. "Test marketing has established a high appeal of color graphics among end users."

Color Will Capture 85% of Graphics Terminal Market by 1985

Venture Development projects a boom in the graphics terminal market, reaching unit sales of 250,000 in 1985, compared to 30,000 produced in 1981. And 85% of those 250,000 graphics terminals are forecast to be in color! The IS-2048 offers OEMs the advantage of entering this rapidly expanding color graphics market ahead of their competition.

Recent communications studies indicate that

managers receive 40% of their information through reports consisting of statistical data accompanied by a written analysis. When these reports are translated into color graphics displays, comparisons between numbers become instantly obvious. Exceptions are readily identified. Data relationships are easily conceptualized and remembered. As a result, management can rely on color to highlight key information and illustrate meaningful trends.

Thus, the quick, clear communication power of color graphics generates faster decision-making, greater accuracy and increased management productivity.

Attractive Pricing and Early 1982 Availability

Intelligent Systems has positioned the IS-2048 for sales to high volume OEMs and large end users. The \$995 price is for quantities of 600 or more, with single-quantity evaluation units available to anyone at \$995, cash with order.

Delivery of the IS-2048 started in January. Mr. McGraw noted, "We will allocate units to quantity purchasers as we receive them and guarantee 45-day delivery after receipt of the order. We have been given firm commitments from our component vendors, which permits us to deliver adequate quantities to buyers who make a prompt decision."

Not The Far East...Color Price Breakthrough Came From Georgia

While everyone was watching Tokyo and Hong Kong, anticipating the next price/performance breakthrough in color graphics, an historic price announcement was quietly prepared in Norcross, Georgia, in the rolling hills some 30 miles north of Atlanta.

Since introducing the first color terminal using a microprocessor in 1975, Intelligent Systems has been surprising the industry with one "first" after another. Soon came the first CP/M based color microcomputer, then the first color-enhanced word processing system, and the first dot addressable color terminal priced under \$3,500.

Price/Performance Factor: Design of Single-Board Terminal

Now the company reveals how it was able to produce the first full-featured color graphics terminal for less than \$1,000.

Intelligent Systems' IS-2048 is the end result of a full year of product refinement, involving 30 prototypes tested at customer sites. A significant concept that permitted performance excellence at such a remarkable price was the design of a "single-board" terminal. This design/concept eliminated expensive card cages and complex circuitry.

Productivity, High Volume Contribute to Record-Low Price

In 1981, at a time when business analysts were worried about the nation's level of output, Intelligent Systems set impressive records for high productivity per employee. According to the 1981 Operating Ratios Summary of the American Electronics Association, the company more than doubled the national average for the industry!

Based on Intelligent Systems' track record of high unit sales and corresponding volume-production and purchasing, firm commitments from component vendors made possible a 1982 reduction in component costs, some by as much as 40%. These cost reductions were a major factor in the record-breaking price of \$995 for the IS-2048.

Cost-conscious design and development, high productivity and volume purchasing combine to explain Intelligent Systems' continuing price breakthroughs. And that explains why more and more observers, who formerly looked to Tokyo or Taiwan for pacesetter production and pricing, now are turning their attention to the red clay hills of Georgia, to a company accustomed to making color graphics breakthroughs—Intelligent Systems Corp.

Color Graphics Terminal—\$995 An Industry First, IS-2048 Breaks \$1000 Price Barrier

Intelligent Systems announces the IS-2048, a full-featured color graphics terminal for \$995 in quantities. The IS-2048 is an ASCII, all-purpose, intelligent color graphics terminal designed for high-volume end users and OEMs. The \$995 price is for the complete, self-contained unit and includes the 13" color CRT, CPU, 72-key ASCII keyboard, graphics package and graphics software, including firmware for vectors, bar graphs and point plots. Additional features include:

- 8 foreground colors with blink and 8 background colors
- Refresh rate of 60 frames a second, delivering excellent color saturation, brightness and resolution
- CRT display capacity of 2048 characters
- RS-232C communications port
- Special graphics characters which provide enhanced resolution
- Selectable baud rates from 110 through 9600
- Editing commands for tab, erase line, erase page, blink, color selection, cursor positioning, transmit

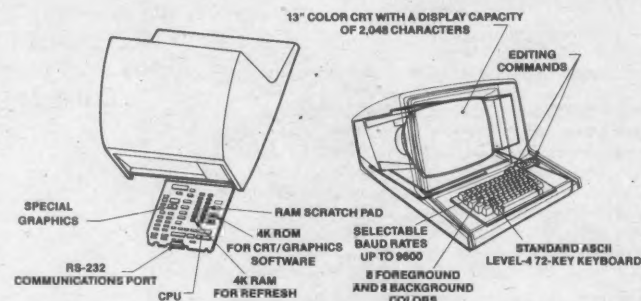
Intelligent Systems' IS-2048 is manufactured for commercial/industrial applications and is a full-featured, business-quality color graphics terminal. The IS-2048's memory consists of a RAM scratchpad, 4K RAM for refresh and 4K ROM for CRT and graphics.

IS-2048 Is Designed for High-Volume End Users and OEMs

"The secret of success in selling to the high-volume market is fairly simple," states Peter J. Curnin, company president, regarding the announcement of the IS-2048. "You have to deliver the right product with the most sought-after features, sooner and for less money than the competition." With the IS-2048, Intelligent Systems has done exactly that.

Intelligent Systems, founded in 1973, pioneered the color graphics business. The company manufactures a complete line of color graphics display terminals, desktop computers and stand-alone graphics systems. These products are used in a variety of applications, including presentation graphics, MIS, scientific/engineering and numerous control applications.

Noted for its high volume and the industry's best price/performance ratios, Intelligent Systems was the first company to manufacture and ship over 20,000 color graphics units. Several years ago the company crossed the \$2,000 price barrier, more recently introduced a color graphics terminal for under \$1,500, and now the company has smashed through the \$1,000 color barrier—again ahead of other color manufacturers.



Experienced Graphics Team Converts Software to Color

Intelligent Systems Offers Color Conversion Training Seminars

Seminars providing intensive training in color graphics are now available to customers and potential users. For a \$350 fee, buyers can send up to four employees to Intelligent Systems' headquarters where instructors, software engineers and product designers provide expert help in the conversion to color.

Implementation of the IS-2048 consists of connecting to a host computer and modifying existing applications software to produce color graphics displays. The seminar and documentation provide all of the instructions and codes required for communicating with the IS-2048. Where needed, an ANSI Terminal Firmware Program is offered as an option for only \$100.

Conversion of Software Is Simple; Creating Graphs Takes a Bit Longer

The addition of a few simple codes will generally bring up bright, colorful displays. Adding graphics and designing effective screens is a bit more time consuming, but Intelligent Systems' experienced instruction team simplified that process.

"We are confident that our training will provide all the necessary information and documentation for successful use of the IS-2048," Director of OEM Sales Paul R. McGraw states. "We have

some of the most experienced color graphics instructors and implementors in the business at our factory headquarters. At the end of a one-day work session we guarantee that our potential users will see their most useful screen display translated in color graphics. If we don't succeed, we'll refund the \$350 workshop fee."

Mr. McGraw envisions some of the strongest demand for the product coming from the MIS sector, declaring, "Firms serving the MIS area, as well as MIS managers, are feeling real pressure to convert to color. We offer them a way to do it quickly, inexpensively and with solid, experienced support. Financial reporting, trend analysis—it's all faster and much more informative for users when it's conveyed in color graphs."

For further details on Intelligent Systems' Conversion-to-Color-Seminars, contact Paul McGraw at company headquarters.



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Seminar to Focus On Color Use In DP Graphics

PALO ALTO, Calif. — The use of color in computer graphics will be the focus of "The Merger of the '80s — Color and the Computer" seminar to be held Feb. 25-26 at the Hyatt Richeys Hotel here. The seminar is sponsored by Educational Resources Associates, Inc. of Brookline, Mass., and is supported in part by a grant from Polaroid Corp.

Speakers will include John Durrett, director of the Center for Automated System in Education at Southwest Texas State University; Joy Turner Luke, artist and color educator; Morris Samit, manager of computer systems marketing at Polaroid; and Randall Stickrod, industry consultant. Topics will include current and future color hardware and software, color theory, the psychology of color and information processing of color graphics.

The cost of "Color and the Computer" is \$250 per person.

Further information on the seminar and/or hotel reservations is available from Educational Resources Associates, Inc., Suite 500, 209 Harvard St., Brookline, Mass. 02146.

HRSP Meeting Slated for May

SAN FRANCISCO — The second annual national conference of HRSP, Inc. — the Association of Human Resource Systems Professionals — will be held on May 26-28 at the Marriott Hotel in Chicago.

The 1982 HRSP conference is organized around general sessions, lectures, workshops and vendor exhibitions, an agency spokesman explained. The conference theme is "Human Resources and Systems — A Look to the Future."

The conference is intended as a nonvendor sponsored meeting to provide DP and personnel professionals an opportunity to discuss the aspects of human resource systems design, development and operation. Conference activities reportedly are geared toward sophisticated HRS users, as well as beginners.

Conference attendance will be limited. The fee for HRSP members is \$300 and \$400 for nonmembers. Requests for conference materials should be made to Catherine J. Roberts, Brunswick Corp., One Brunswick Plaza, Skokie, Ill. 60077.

WPS Conference Planned July 28-31

HOUSTON — The International Association of Word Processing Specialists, Inc. (WPS) will hold its third annual meeting — WPS '82! — July 28-31 in Oklahoma City, Okla. The meeting will feature an exhibit of word processing equipment.

It will also feature a panel discussion on such topics as career enhancement, the integrated office and stress management. The registration price has not yet been decided.

More information can be obtained from WPS, Suite 100, 1669 S. Voss, Houston, Texas 77057.

DEC Acquires Unix License ... Sort Of

By Jeffrey Beeler

CW West Coast Bureau

SANTA MONICA, Calif. — Armando Stettner arrived at a recent users group meeting here with startling news: His employer, Digital Equipment Corp., had just acquired its own license to AT&T's Unix operating system.

Even more astounding, DEC had decided to make the license available to hundreds of users free of charge.

But the giveaway had a catch: The DEC license consisted of a flat rectangle of metal rather than a legally binding piece of paper, and it was much better suited to the bumper of a family car than to a PDP-11 or a VAX-11/780.

"I've wanted for a long time to announce that DEC has a Unix license, and now I'm happy to say I can finally do it," Stettner said at the recent winter meeting of the Usenix users association.

Keeping a perfectly straight face, Stettner then

paused, reached inside his speaker's stand and pulled out a flawless imitation of an automobile license plate that bore the word "Unix" in large blue letters against a white background. An audience of several hundred Usenix attendees roared with laughter.

After the laughter subsided, Stettner — who serves on the technical staff of DEC's Unix engineering group in Merrimack, N.H. — recounted the fake license's brief history. "At first, we considered modeling our Unix plate after New Mexico's, which bears the state slogan, 'Land of Enchantment,'" he recalled. "But in the end, we patterned it instead after our own state's plate, which carries the New Hampshire motto — 'Live Free or Die.'" Again, the entire conference hall erupted with laughter.

The most hilarious comment of the day, however, came a moment later from one of Stettner's listeners: "Where did you guys learn to make those things so well?" he asked.

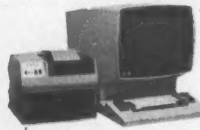
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Calendar

March 7-10, Las Vegas — **Texas Instruments Minicomputer Information Exchange.** Contact: Texas Instruments Minicomputer Information, M/S 2200, P.O. Box 2909, Austin, Texas 78769.

March 8-10, San Francisco — **Data Base Management Systems: General Concepts and Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 8-10, Chicago — **Data Communications: Effective Network Design.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held March 15-17 in San Francisco.

March 8-10, Williamsburg, Va. —

Computers in Elementary Education. Contact: Association for Educational Data Systems, 1201 16th St., N.W., Washington, D.C. 20036.

March 8-10, New Orleans — **Capacity Management Forum.** Contact: Sondra Schwartz, Boole & Babbage, Educational Services Division, 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

March 8-11, New York — **CICS/VS System Design.** Contact: I. Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

March 8-12, Chicago — **Systems Analysis Workshop.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 8-12, New Orleans — **Orga-**

nizing the Capacity Management Function. Contact: Institute for Software Engineering, Suite 200, 535 Middlefield Road, Menlo Park, Calif. 94025.

March 8-12, Tulsa, Okla. — **Structured Systems Design/Structured Program Design Combined Course.** Contact: Jim Highsmith, Ken Orr and Associates, Inc., 715 E. 9th, Topeka, Kan. 66607.

March 8-12, Rochester, N.Y. — **Structured Analysis Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 8-12, San Francisco — **Structured Design/Programming Workshop.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 8-12, Chicago — **Design by Objectives.** Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011.

March 8-12, Hanover, West Germany — **Didacta '82.** Contact: Hanover Fairs Information Center, P.O. Box 338, Whitehouse, N.J. 08888.

March 8-12, New York — **JCL Basic.** Contact: Boeing Computer Services Co., 560 Lexington Ave., New York, N.Y. 10022.

March 9, San Francisco — **Accessing and Utilizing Public Data Bases.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 9-10, Morristown, N.J. — **PBX-Centered Advanced Office Systems.** Contact: Probe Research, Inc., P.O. Box 590, Morristown, N.J. 07960.

March 9-11, Zurich, Switzerland — **1982 International Zurich Seminar on Digital Communications.** Contact: M. Frey, EAE, Secretariat '82 IZS, Siemens-Albis AG, CH-8047 Zurich, Switzerland.

March 9-11, Washington, D.C. — **1982 Federal Office Systems.** Contact: National Trade Productions, Inc., P.O. Box 9418, Annapolis Road, Lanham, Md. 20706.

March 9-11, Dallas — **Computer Graphics.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

March 9-12, Teaneck, N.J. — **Leadership: Managing and Influencing People.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 9-12, Boston — **Structured Programming: Techniques for Productivity.** Contact: Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 9-25, Summit, N.J. — **Vsam in Cobol.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

March 10-12, Buffalo, N.Y. — **Vsam Performance Workshop.** Contact: Solutions, Inc., Box 989, Montpelier, Vt. 05602.

March 10-12, San Francisco — **Systems Analysis and Design.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 10-12, San Francisco — **Introduction to Micro/Personal Computers: Application, Selection and Users Guidelines.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 10-12, Chicago — **DP Operations Today: Effective Scheduling and Console Operations.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 10-12, Washington, D.C. — **Evaluating and Selecting Computer Software Packages.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 11-12, San Francisco — **Software Quality Assurance and Configuration Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd.,

(Continued on Page 38)

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STRATUS VS. TANDEM

(Or how the hardware non-stop solution has made the software non-stop solution obsolete.)

"If you drive down the cost of physical hardware, you can make typically redundant paths for less money. Not surprisingly, most redundancy breakthroughs that will occur happen in hardware rather than in software."

You can build a double computer inside one box for less dollars, as opposed to doing it in software, which continually needs maintenance and revision, as well as improvement."

by Aaron Goldberg
of IDC which
appeared in COMPUTERWORLD's
December 28, 1981 issue.

Now that the computer age is in full stride, 100% availability is fast changing from a luxury to a necessity. Downtime and its costs are unacceptable, especially when there is an alternative. Now that non-stop operation is becoming a universal requirement, there is demand for an improvement over the traditional approach. These computers must provide better performance, be easier to use, be easier to program and re-program, be less complicated and less expensive. We believe that the Stratus hardware based non-stop system answers these demands. Let us explain.

Why more hardware is better than more software.

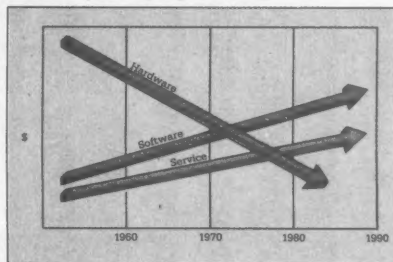
The crux of the problem with Tandem's software based system is that it requires complex, performance stealing software to provide non-stop operation. This software robs the system of precious resources because it uses processing cycles to pass status and checkpoint information back and forth between two computers. What's more, this passing of information must occur at four levels: operating system, user program, file management, and terminal control.

Stratus, meanwhile, has eliminated all this reliability software by having duplicate hardware components tightly coupled, dedicated to performing the same tasks at the same time. It's like having two computers in one, rather than two separate computers. Checking hardware logic detects errors with no performance loss and stops failing components instantly. The duplicate partner continues without interruption, unaffected



	Tandem	Stratus
1. Does it require additional system design and additional software to implement non-stop processing?	Yes	No
2. Is there a trade-off between reliability and performance?	Yes	No
3. Can the system be repaired while it is processing by a non-technical person?	No	Yes
4. Can you add modules of processing power without stopping the system?	No	Yes

by the failure. This is all transparent to the programmer and the user. With Stratus, there is no performance or data loss when there is a failure, no operator intervention, and no special programming.



While software costs will rise because they are people dependent, experts agree that hardware costs will continue to fall.

Why Stratus is easier to implement than Tandem.

The Stratus designer and programmer might as well be dealing with a conventional computer; one of them, not two. Programmers are in a familiar environment. By providing industry standard languages, applications can be moved over without redesign or major reprogramming. Non-stop operation is a bonus, not a complex effort.

With Tandem the system designer and programmer is working with two computers. (An environment unfamiliar to most designers and programmers.) This approach requires more experienced personnel, takes more time for application development, requires continual maintenance, and as a result is more costly.

Hardware costs less.

The Stratus concept could not have been executed 10 years ago, 5 years ago, or even 2 years ago. It certainly couldn't have been done in 1974 when Tandem started developing its system. It is possible now because of the dramatic price drop of hardware components. Because of this lower cost of hard-

ware, and because of the simplicity of its architecture, Stratus can offer continuous processing at a price competitive with traditional systems that don't offer non-stop processing. Compared with Tandem, Stratus is about \$100,000 less expensive for comparable entry level configurations, and the difference gets larger with bigger systems.

Don't overlook our software.

Despite what might seem to be a total emphasis on hardware, the fact of the matter is that we spent more development money on software than on hardware. Briefly, here's our software list: Virtual Operating System (VOS), Data Management System, CRT oriented command language, Cobol, Basic, PL/I, Networking using X.25, IBM Communications, full-screen editor, symbolic debugger, and a complete Word Processing package.

If your application requires total reliability, if you are considering any kind of dual-processor configuration or if you're considering Tandem, then you should fill out our coupon or call Nick Bologna, Director of Product Marketing, 617/653-1466.

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Calendar

(Continued from Page 36)

Delran, N.J. 08075. Also being held March 11-12 in New York.

March 11-12, Chicago — **Data Communications: Advanced Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 11-12, Los Angeles — **Computer-Aided Graphic Arts and Visual Communications.** Contact: Perry Jeffe, Pratt Center, 505 White Plains Road, Tarrytown, N.Y. 10591.

March 11-12, Los Angeles — **Computer and Data Processing Contracts.** Contact: Law Journal Seminars-Press, 233 Broadway, New York, N.Y. 10279.

March 11-12, San Francisco — **Soft-**

ware Maintenance Technology. Contact: Software Research Association, P.O. Box 2432, San Francisco, Calif. 94126.

March 11-12, Boston — **Human Factors in Office Automation.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 11-12, Arlington, Texas — **DOS/JCL.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 11-12, Boston — **Computing Standards.** Contact: Education Foundation of Data Processing Management Association, P.O. Box 91295, Department CSC, Los Angeles, Calif. 90009.

March 13, San Francisco — **CICS/VS Command Level Programming Workshop.** Contact: Expertise Extension Workshop, 220 N. Glenoaks Blvd., Burbank, Calif. 91502.

March 13, Los Angeles — **DL/1 Programming (IMS/VS DB) Workshop.** Contact: Expertise Extension Workshop, 220 N. Glenoaks Blvd., Burbank, Calif. 91502.

March 13, Los Angeles — **Data Communications Systems Workshop.** Contact: Expertise Extension Workshop, 220 N. Glenoaks Blvd., Burbank, Calif. 91502.

March 14-16, Carmel, Calif. — **Automated Office of Tomorrow.** Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

March 14-19, Los Angeles — **Advanced DP Training Management Workshop.** Contact: Deltak, Inc., 1220 Kensington Road, Oak Brook, Ill. 60521.

March 15, Washington, D.C. — **The James Martin Executive DP Summary.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402.

March 15, Summit, N.J. — **Assembler Language.** Contact: Advanced Training Center, Division of Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

March 15-16, Dallas — **Legal Fundamentals of Software.** Contact: American Institute for Professional Education, Carnegie Building, 100 Kings Road, Madison N.J. 07940.

March 15-17, Clearwater Beach, Fla. — **Second Annual Conference on Computer Security & Disaster Recovery Set.** Contact: HSH National Management, Inc., 150 E. Wilson Bridge Road, Worthington, Ohio 43085.

March 15-17, New York — **Speech Coding.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, New York — **Effective Computer Operations Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, New York — **Word Processing: Effective Operations Management.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, San Francisco — **Information Systems Planning: A Structured Approach.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, Washington, D.C. — **Introduction to Word Processing: Concepts, Systems and Applications.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, Dallas — **Structured Testing.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, Boston — **Data Communications: An Introduction to Concepts and Systems.** Contact: Seminar Department, Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

March 15-17, Boston — **Mini/Microcomputer Systems: Guidelines for Evaluation and Selection.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

March 15-17, Washington, D.C. — **Effective Office Automation for Increased Management Productivity.** Contact: The Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

March 15-17, Phoenix — **A Course for Computer Professionals.** Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

March 15-17, Denver — **Advanced DP Auditing Concepts.** Presented by Coopers & Lybrand. Contact: Marge



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March 15-17, Boston — **Communications Technology in Education and Training.** Contact: Emerson College, 100 Beacon St., Boston, Mass. 02166.

March 15-17, Tempe, Ariz. — **Fiber Optical Communications.** Contact:

Call for Papers

SIXTH ANNUAL SYMPOSIUM ON COMPUTER APPLICATIONS IN MEDICAL CARE, Washington, D.C., Oct. 30-Nov. 2.

This program was designed to inform physicians, health care administrators, biomedical scientists, engineers, health care professionals and information technology specialists about current and potential applications and methods for the application of computer and communications technology to health care. Papers are being sought that document computer applications in medical care and their impact on patient care, cost control and research.

Notification of intent, along with a brief summary of the paper's content, is due Feb. 15. These should also include the name, full address and phone number of the author and be sent to Bruce Blum, SCAMC — Office of CME, 2300 K St., N.W., Washington, D.C. 20037. Four copies of draft manuscripts are due March 15. Final notification of acceptance will occur on June 1.

1982 HUMAN FACTORS SOCIETY ANNUAL MEETING, Seattle, Oct. 25-29.

Papers describing research on the relationship of people to machines, consumer products and environments are being solicited by this conference committee.

Abstracts are due March 1 to Dieter Jahns, Technical Program Director, P.O. Box 46309, Seattle, Wash. 98126. Authors will be notified of acceptance on April 30.

AMERICAN SOCIETY FOR INFORMATION SCIENCE (ASIS '82), Columbus, Ohio, Oct. 17-21.

The technical program committee is still accepting papers for the 45th annual meeting of Asis. The theme of this event is "Information Interaction," and topics of interest include information systems, systems design, organizational interaction, educational interaction, communications technology and graphics communications.

Contributions with broad appeal as well as those cited are being solicited. Papers should not exceed 1,500 words and should be accompanied by a 150-word abstract. Submissions are due by March 26 to John Fried, Room CW2, Battelle Columbus Laboratories, 505 King Ave., Columbus, Ohio 43201. Notification of acceptance will be sent by May 7.

ASSOCIATION FOR COMPUTING MACHINERY'S (ACM) FIRST CONFERENCE ON SECURITY, AUDIT AND CONTROL IN OFFICE SYSTEMS, St. Louis, Mo., Oct. 7-8.

This conference is being jointly sponsored by the ACM Special Interest Groups on Business Data Processing, Office Automation and Security, Audit and Control.

Technical papers and description of successful applications are being sought by the program committee of this event. Appropriate topics include local-area network security, application of trusted computing systems, security applications, software security policies and systems auditability.

Three copies of completed manuscripts not to exceed 20 typewritten, double-spaced pages are due by April 1 to David Callaghan, Babson College, Babson Park, Wellesley, Mass. 02157. ISSUE '82, New Orleans, La., Oct. 10-14.

Issue, Inc., a nonprofit association for international SPSS software users, is seeking papers for presentation at its sixth annual meeting. Contributions are being welcomed in the following areas: data analysis; statistical methodology; research training; data base management systems; computer graphics; microcomputers and data analysis; training materials and documentation; interesting applications of SPSS software; and anything else of general interest to the SPSS, SCSS or IDA user.

Single-page abstracts must be sent by May 1 to Dr. Michael Stentz, 2661 El Goya, Modesto, Calif. 95354. Notification of acceptance will be sent to authors two weeks later.

Arizona State University, College of Engineering and Applied Sciences, Tempe, Ariz. 85287.

March 15-18, New York — **DMS/CICS/VS Design and Programming.** Contact: I. Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

March 15-18, Phoenix — **DOS/VSE Vsam for Cobol Programmers and Vsam for Cobol Programmers.** Contact: Software Information Services, P.O. Box 4132, Bellevue, Wash. 98009.

March 15-18, Boston — **Structured Programming: Techniques for Productivity.** Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, P.O. Box 181, Wellesley, Mass. 02181.

March 15-19, Arlington, Texas —

Systems Design Workshop. Contact: Q.E.D. Information Sciences, Inc., Q.E.D. Plaza, 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

March 15-19, Baltimore — **Systems Workshop II.** Contact: Ware Associates, 38 Main St., Hudson, Mass. 01749.

March 15-19, Edmonton, Canada — **How to Develop a Long Range DP Plan.** Contact: BSI, 4720 Montgomery Lane, Bethesda, Md. 20814.

March 15-19, Washington, D.C. — **Structured Programming and Software Engineering.** Contact: The George Washington University, School of Engineering and Applied Science, Washington, D.C. 20052.

March 15-19, Charleston, S.C. — **Structured Design/Programming**

Workshop. Contact: Structured Methods, Inc., 7 W. 18th St., New York, N.Y. 10011. Also being held March 15-19 in Chicago.

March 15-19, New York — **CICS/VS Application Programming.** Contact: On-Line Software International, 65 Rt. 4 E., River Edge, N.J. 07661.

March 15-29, Piscataway, N.J. — **CICS/VS Command-Level Applications Programming.** Contact: I. Zelin, Comped, 1133 Ave. of the Americas, New York, N.Y. 10036.

March 16, Boston — **The James Martin Executive DP Summary.** Contact: Technology Transfer Institute, 741 10th St., Santa Monica, Calif. 90402. Also being held March 17 in Chicago and March 18 in Los Angeles.

Now, it's just as simple to prevent access errors as it is to make them.

Access-related errors. They often start with a well-intentioned employee who inadvertently accesses an unfamiliar file. And then mistakenly alters it. Causing, as a result, a lot of manual work to reconstruct all interrelated files. And reports.

Like it or not, it happens. With alarming regularity. And that's why mistakes are a far bigger security threat than all the cloak and dagger fear of malicious intent.

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In operation, SAC enables you to establish data security at your own pace. You can define security criteria for the entire system. Or implement controls on sensitive information one step at a time. With either method, it's easy to adapt to changing security needs.

In all cases, system entry protection ensures that each user is authorized before execution is allowed.

SAC also gives you explicit control over what specific files, data sets, or group of data sets an authorized user can access. And what functions he or she can perform with that data.

There's an added value behind SAC as well. It's from Electronic Data Systems, one of the world's largest data processing specialists. For you, that means people, expertise and a level of ongoing support that guarantees results. The first time around.

Find out how easy it is to protect vital business information from expensive errors. And how easy it is to evaluate SAC with a free, 30-day trial. Write us or call toll-free: 1-800-527-0128. In Texas: 1-800-442-5791.

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EDITORIAL

Pandora's Box

While the U.S. Postal Service's recent entry into electronic mail heralds a new era in commercial communications, it also creates a Pandora's box of potential problems for users, according to a recent National Research Council study [CW, Feb. 8].

Launched earlier this year, the Electronic Computer-Originated Mail (Ecom) service involves two types of message delivery: computer-to-computer transmission and standard first class mail. Basically, messages are sent from one post office computer to another, printed out and then sent through regular mail channels.

Privacy standards for the second leg of the system — the one using conventional mailing procedures — are fully protected under postal statutes. Access to sealed mail requires a court-authorized search warrant that must show the material constitutes evidence of a crime, is criminal contraband or is destined to be used for a crime.

However, the first leg of the service — involving computers and telecommunications — falls under the jurisdiction of the Communications Act of 1934, and therein lies the potential privacy problem.

Under current communications law, the contents of a telecommunications message must be made available to authorized investigators "in response to a subpoena" or "on demand of other lawful authority." In effect, this means that electronic messages can be perused by lawful authorities for no specified reason, the National Research Council reported. And lawful authorities are described as "a wide range of investigators, including . . . intelligence and counterintelligence agencies."

The council sees other holes in Ecom's telecommunications net: Postal authorities will occasionally stop and examine received messages to determine print quality, and telecommunications services are vulnerable to eavesdropping outsiders who intercept messages.

True, the bulk of Ecom traffic will probably be things like consumer bills. However, it may eventually contain such worthwhile booty as corporate mailing lists and contractual actions.

Instead of tackling the security question head-on, postal authorities have left the job of data protection to the commercial telecommunications carriers that shuttle messages from one Ecom computer to the next. Unfortunately, this added protection will cost the Ecom user 25% to 50% more than what the Postal Service projects as the average price of its electronic mail service, according to the council.

Computerworld supports the council's recommendation that the Postal Service establish its own strong internal security procedures, including the use of encrypted links in the Ecom chain. We also maintain that since the Postal Service is now a player in the telecommunications ballpark, it should take the initiative in recommending legislation to Congress that would strengthen protection for electronic mail.

DATA PAST

Five Years Ago Feb. 21, 1977

WASHINGTON, D.C. — The American National Standards Institute X3T9 subcommittee voted to publish the proposed I/O channel interface standard for public review and to send it to the full Computer and Information Processing Subcommittee (X3) of the National Bureau of Standards for subsequent balloting. The vote was 33 in favor, eight against.

Ten Years Ago Feb. 16, 1972

WASHINGTON, D.C. — Plans to transmit computer-based criminal information by an experimental satellite were being considered by the Federal Bureau of Investigation with the backing of the National Aeronautics and Space Administration. A proposal to launch a satellite dedicated strictly to law enforcement uses was also being considered.



'Taking Aim?'

LETTERS

Misleading Impression

"ACM Head: Consider Government Review of Research" [CW, Jan. 25] leaves a strong impression that I support systematic government review of scientific publication and recommend that the scientific community seriously consider joining me. This is not so.

I spent the beginning of the telephone interview attempting to correct the writer's misinformation about what Adm. Inman actually said (I was there) and what the Public Cryptography Study Group actually recommended (I read the report). Somehow the writer concluded from this that I want to nudge us along toward government review of publications. I do not.

I am willing to discuss Adm. Inman's suggestions because I am genuinely anxious to understand why, after so many quiet years, the government is lately so bent on controlling the flow of scientific ideas. Adm. Inman's position is interesting (to me) because it is the only statement mentioning cooperation I've heard from a high government official.

Somehow the writer concluded that my willingness to talk and my interest in Adm. Inman's views means that I support government censorship of publication. I do not.

For the record, here is my position: The clash between national security and scientific freedom is apparent but not real. The true clash is between secrecy and openness. National security and scientific freedom are compatible. The success of the U.S. scientific enterprise is in no small measure due to the lack of government interference in the processes of technology transfer, of which the first step is publication of basic research.

Recent attempts by government

agencies to use export control laws to restrict some scientific publication and recent proposals to extend export control laws to cover all scientific publication aim at replacing the current policy — openness — with a new policy of secrecy.

The measures required to achieve a significant reduction in risk to the national security through a policy of secrecy would be more consistent with a police state than a democracy. They would, moreover, cause significant damage to our scientific enterprise. I oppose any attempts to institute a policy of secrecy with respect to science.

Although in principle a system of noncompulsory review by government of proposals and papers is compatible with openness, I am extremely skeptical that it could remain so in practice.

There are too few checks and balances favoring the individual private-citizen scientist under the present system.

The notion that the government should own my scientific ideas until it gives them back to me is, quite frankly, repugnant.

Peter J. Denning
President

Association for
Computing Machinery

New York, N.Y.

Computerworld welcomes comments from its readers. Preference will be given to typed, double-spaced letters of 150 words or less. Letters may be edited for purposes of brevity and clarity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, P.O. Box 880, Framingham, Mass. 01701.



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SOFTLINE /Werner L. Frank

File Management or Data Management?

One cannot engage in a discussion of computer technology without encountering and being confused by the terms file management system, data management system, data base management system (DBMS) and information management system.

These terms cover three data processing notions, concerning structure, procedure and access of data in a computer system. Underlying these expressions is the rather subtle and very confusing use of the terms data file and data base.

The issue of structure leads us to distinguish between a data file and a data base. For purposes of this presentation, a data base, as contrasted with a data file, is a more complex structure of data that has interdependence and can be viewed as a combination of a number of data files.

There is a secondary implication that a data base, unlike a data file, avoids data redundancy and is able to separate applications programs from data base dependency.

Coordinate Processing

Today, most file-dependent systems can coordinate the processing of multiple files. Furthermore, the movement toward relational systems encourages one to think of data bases as a number of simple files or tables. Hence, making a distinction between data files and data base may no longer be essential or even useful.

Procedure refers to the means by which programmer or user communication can be facilitated to perform operations on the data files or data bases. This would include query and report generators as well as editing and validation schemes for data accession.

Finally, we have the issue of access. This refers to the mechanism for locating and extracting, according to certain conditions, pieces of data that may be contained in the data file or data base.

Let's return to the aforementioned terminology and see how it relates to these three independent aspects.

Both a file management system and a data management system connote a combination of facilities that include all three of the indicated components, namely: access, procedure and structure. The distinction between these two expressions is made by the implied data structure: Is it a data file or a data base? But as we have already seen, there is a growing blur between files and data bases and hence, file management systems and data management systems

Popular Term

DBMS is the popular term that is used to describe the access process to get at the data. Unfortunately, this nomenclature is often used interchangeably with data management system and data base system.

This leaves us with information management system. When written with capital letters, the label applies specifically to a product of IBM, usually called IMS, which is a particular instance of a DBMS.

The naming of a very popular and highly visible DBMS, or access sys-

tem as we prefer, with the label Information Management System, is therefore confusing. One doesn't, in these types of systems, manage information. One manages data. A data management system generates information or, putting it another way, information is produced as a result of operating a data management system.

Of course, the specific IBM term — Information Management System — is no longer a generic description of a process or procedure. Rather, IMS is the name of a product, whose meaning cannot be deduced from the three individual words making up the name. In fact, IBM designates IMS as a "data base manager," which is a much better description.

Unfortunate Construction

This anatomy of terminology shows us that we lack adequate vocabulary with which to describe the handling of data. We especially note that "data base management system" is an unfortunate construction that hardly connotes its fundamental objective of data access.

We offer the following suggestions to clarify these seemingly confusing and possibly conflicting notions.

Let the overall name given to the process of structure, procedure and access be "data management sys-

tem," whether we deal with so-called files or data bases. Let us advocate the retirement of the term DBMS. The access aspect of a data management system could be referred to as the "data base access system." The procedural aspect of a data management system can be described as "data manipulation languages," which, incidentally, is a phrase already acceptable to the industry.

We have mentioned procedure as an important operative element encompassed by the term data management system. Procedure includes the means of communication by which users operate on data from the point of view of storage and retrieval.

Here again we begin to encounter terminology that is often bewildering. Surely you will meet the term "procedural" versus the term "non-procedural" as it relates to computer language types.

Widespread Enthusiasm

Since there seems to be widespread enthusiasm for nonprocedural languages, it appears that all languages today must take on that label, even though there is a good deal of procedure involved in most of them. Computer languages simply do not divide neatly into such a dichotomy.

A popular claim for nonprocedural languages is that they be English-

like. This is especially true for query systems. But is there really any difference between competing alternatives? Does it really matter if the conditional statement comes before or after the report specification? Or does it matter if the conditional statement begins with the word IF or FOR or WHERE or WHEN? Doesn't it seem obvious that all of the following statements have essentially the same structure and ease of use?

LIST A	IF B
LIST A	FOR B
LIST A	WHERE B
LIST A	WHEN B
IF B	LIST A
FOR B	LIST A
WHERE B	LIST A
WHEN B	LIST A

We can also argue about the verb designating the output mode. Shall it be SELECT, LIST, DISPLAY, PRINT or just plain OUTPUT?

It seems to me there are essentially three types of output that can be requested. They are output to be printed (hard copy), output to be shown on a CRT terminal (soft copy) or an output that is to be retained in the form of a file available for subsequent access. Surely three standard terms can be agreed upon that reflect these three alternatives.

(Continued on Page 42)

HUMAN CONNECTION /Jack Stone

Systems Novice Learns to Cope: Office Mini Relieves Mainframe Atrophy

"OK, Jack, I've got twin Wang Laboratories, Inc. OIS 140's being shipped to me in two months and I've been designated as systems manager. What do I do now?"

The call, which I received last August right out of the blue, was from Ira Schoen, a management analyst with the U.S. International Communications Agency (Usica).

Only a few months earlier, Ira received his very first exposure to computers and that was in a computer literacy class, an introductory DP course that I teach regularly for Usica foreign service officers and headquarters managers. And here he was now: a neophyte systems manager. I was surprised that he didn't seem nervous during our telephone conversation.

I remembered that during the class Ira mentioned the deep frustration he felt because the data processing needs of his organization, the Education and Cultural Affairs directorate (ECA), were not being met. So I concluded that the 140 order was placed as an answer to these problems.

I also recalled that he asked me for advice during one of the class breaks. As I didn't want to add another burden to his woes at the time, I chose not to enlighten him about how computer analysts often take weeks — not minutes — to solve DP problems.

Instead, I issued some comforting remarks in the form of "Welcome to

the wonderful world of data processing" and "you should be pleased to be next in the long line of happy users."

Tale of Woe

A few days later, we met and he unveiled this tale of DP woe:

"Briefly stated, ECA is the arm of the federal government responsible for arranging certain government-sponsored visits for educational and cultural purposes. We assist in the planning and funding of trips overseas for Americans and of travel to the U.S. for foreign nationals. Our annual budget is about \$100 million.

"But in data processing terms, ECA is a 'small user,' an expression we found to equate to 'small loser,' for reasons I'll summarize in a moment.

"We are the primary users of three applications systems on the mainframe computer that is managed by our ADP Division. These systems are intended to provide us operational, financial and management reports on ECA visitors.

"However, the systems have atrophied. They were installed many years ago and, for a number of reasons, have lost a great deal of their usefulness. Perhaps the most significant is that the systems had to be designed for batch-oriented machinery, the then-accepted technology.

"But now, because of the usual turnaround problems associated

with such systems, we simply can't respond to requests for special reports, particularly those from our overseas posts.

"Then there's the problem of collection of source information. All of our program officers maintain manual files on visitors within their area of responsibility, but no two files are organized the same way.

To feed this information into the mainframe computer, we have to deal with an unending conversion process that is tedious and labor-intensive.

"Of course, the answer is a major upgrade of the current systems to an on-line system, during which we could add a number of new data fields. This is now technically feasible because our computer center hardware was recently upgraded to fourth-generation.

"But how can we ask our Usica DPs to perform the upgrade when we are small users? We shouldn't be demanding that our applications be upgraded ahead of larger Usica DP user divisions who are in the same dilemma we are.

"So, as dreadful as the prospect seemed, we were forced into the decision to acquire our own minis. And we were pleasantly surprised when our ADP people not only concurred in the decision, but tossed in some budget, to boot."

(This is Part One of a continuing story.)

Software Protection

I was pleased to see Thomas Mylott's article, "Software Sales vs. License: Know the Difference" [CW, Jan. 25], in your Special Report on applications packages. Information of this nature is badly needed by end users who, for the most part, are unfamiliar with the unique protection (and hence, licensing) problems faced by software developers. This unfamiliarity has led to many unhappy situations between licensors and their end users.

I am disappointed, however, with Mylott's parting words. His cautions about license agreements are shadowed with implications that those who license proprietary software are, in the main, concerned only with themselves, suggesting their license agreements are unreasonably "one-sided."

The "one-sidedness" is often true, but not necessarily for undue reason. Successful vendors and developers spend a considerable amount of money in legal costs to develop a license agreement that adequately covers the risk they take in releasing their code.

Provisions of confidentiality requirements, specific CPU usage and copy restrictions are often crucial to a developer who is attempting to protect his trade secrets while at the same time providing a user with applications packages that will make his life easier and his business more efficient and profitable.

Myllott's exposure to software license agreements appears to be dif-

ferent from my own.

In the majority of cases I've seen, a developer/licensor is more generous than he's implied. Backup copies, successor CPUs and reasonable confidentiality requirements are, I believe, more common than he has suggested.

Applications packages can be worth their weight in gold. The expense in producing them is often extremely costly to the developer and can take years before the actual licensing of the software turns into profits. This, combined with the unique problem that software is easily copied and, therefore, easily pirated, forces a developer to put tight restrictions on the use of his code — if only to pro-

tect his investment.

What is often not understood is the fact that not only does a developer lose money when his software is misappropriated (stolen), he stands to lose claim to his property altogether if he fails to adequately restrict the use of his software (trade secrets).

An end user is well advised to read the license agreement presented to him very carefully — or have his attorney review it for him. And, if something in the agreement is unacceptable after such review, then attempts at negotiation with the licensor are not uncommon.

However, it is important that an end user understand the position a developer is in when releasing his code. He has something valuable to offer that can be an important tool for the end user.

The nature of this "valuable asset" is such that release of it alone can put the developer at risk by exposing it to potential distribution by pirates and those who don't know any better.

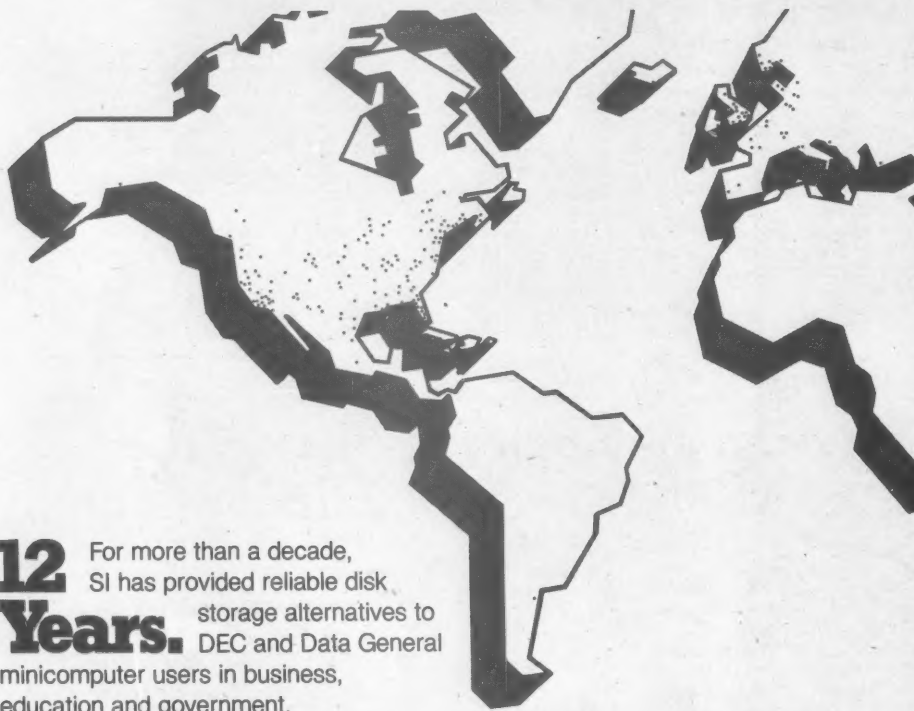
Such unauthorized distribution translates into lost revenues and possible loss of one's trade secrets and that could drive the developer right out of business.

Until the nature of computer software protection is commonly understood by users, and until the software pirates are removed from the playing field, it is vital that developers and users take all good care to communicate well with one another, making every effort to understand the other's needs and to come to an ethical, profitable and fair arrangement.

Robin Robinson
President

Association for Software Protection
Tujunga, Calif.

LETTERS



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Redefining Terminology

(Continued from Page 41)

English-like is also promoted through the use of so-called noise words. Systems are advertised as having the ability to construct natural language queries by being able to include certain designated words that are ignored by the query parsing system.

We are told that rather than make the request: Print Personnel, name, telephone, sex, if sex="male"; we can ask: Print from the Personnel file the name, the age, the sex if the sex is equal to "male."

The second formulation certainly looks like a more natural English language statement than does the first. On the other hand, except for demonstrating a nicety of the system to a first-time user, who would use the second, more verbose form?

This is not to say that natural language approaches are bad or useless. Indeed, if it is possible to communicate with a system in a natural language mode, then one has the best of all worlds.

Verbosity or curtness can then be at the discretion of the user and one has the most important benefit, namely, freedom from the necessity for certain ordered formats and special verbs.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

Documentation Problems

Congratulations! In the past several months you have printed several good articles dealing with documentation problems. The computer industry has relied upon instructive and reference documentation for a long time.

However, there has never been an industrywide recognition of the real role of this activity. I have long desired to see documentation issues discussed in computer industry journals and have been constantly disappointed. (Most articles about documentation have dealt with the difficulties of getting programming staffs to annotate program code.)

In "Responsible Documentation" [CW, Jan. 25], I saw a very serious treatment of a serious subject. It's time that so-called high-technology companies assess the costs of producing poor documentation against the costs of doing the job well.

I, along with many other software technical writers, have felt helpless and ignored as hardware and software development budgets balloon while documentation is asked to do without. Technical writers have contact with "users" as the writer defined them and are frequently in a position to predict imminent disasters; yet documentation departments are usually considered service departments rather than producers. Recommendations from documentation are rarely taken (even with a grain of salt).

Perhaps if *Computerworld* and the other high-technology publications continue presenting documentation issues, we'll get a chance to contribute to the industry in truly meaningful and financial roles.

Diego Gonzalez

Avco Computer Services
Wilmington, Mass.

Another Side to Story

"Wang User Weighing Pursuit of Lawsuit" [CW, Feb. 1] tells only one story about service from Wang Laboratories, Inc. personnel. I would like to submit my story.

Last December, we experienced a hard halt on our disk drive. I put in a service call at 6:10 p.m. on Wednesday. By 7:45 p.m., a service man was on the site to determine the nature of the problem: The fixed media was destroyed due to multiple head crashes.

Early the next morning, replacement parts were here. By mid-afternoon, the parts had been installed and aligned.

During testing, another head crash occurred and new fixed media, heads and boards were required. Another

service man drove the parts up from Los Angeles, then stayed to help on repairs.

I had advised Wang on Wednesday that I was in a particularly bad timing situation and the system had to be up by Saturday.

By putting in hours and effort far beyond the call of duty, they had my system restored and running by 11 p.m. on Friday.

Further, the only service-related problem I have noted concerns acquisition of parts. Certainly the customer engineers from Ventura, Calif., and Los Angeles with whom I have had contact have been most knowledgeable, efficient and responsive.

LETTERS

I can't help but feel that The Albert G. Brock Co., Inc.'s situation is rather unique. None of the Wang users with whom I am in contact has experienced or heard of the lack of response Brock describes.

Perhaps Wang's minimum requirements for customer engineers are different in the Northeast than in California, but I doubt it. It sounds more likely that the Brock company may have had a serious lack of communication with the proper people at Wang.

Sue Andrews
Manager

Accounting/Data Processing
Larson, Bateman & McAllister, Inc.
Santa Barbara, Calif.

Exclusive Definition

I must take strong exception to the reader commentary by Walter Ulrich, "When Is a Consultant Not a Consultant?" [CW, Jan. 11]. The definition of a consultant cannot automatically exclude those who are associated with certified public accountant firms. This is a gross misalignment of a significant portion of the DP consulting community.

Obviously, these professionals must have the technical competence in terms of training and successful business experience as described in the commentary.

The question as to being independent with respect to other services provided by the CPA firm has been addressed by the American Institute of Certified Public Accountants (Aicpa) in its statement of manage-

(Continued on Page 46)



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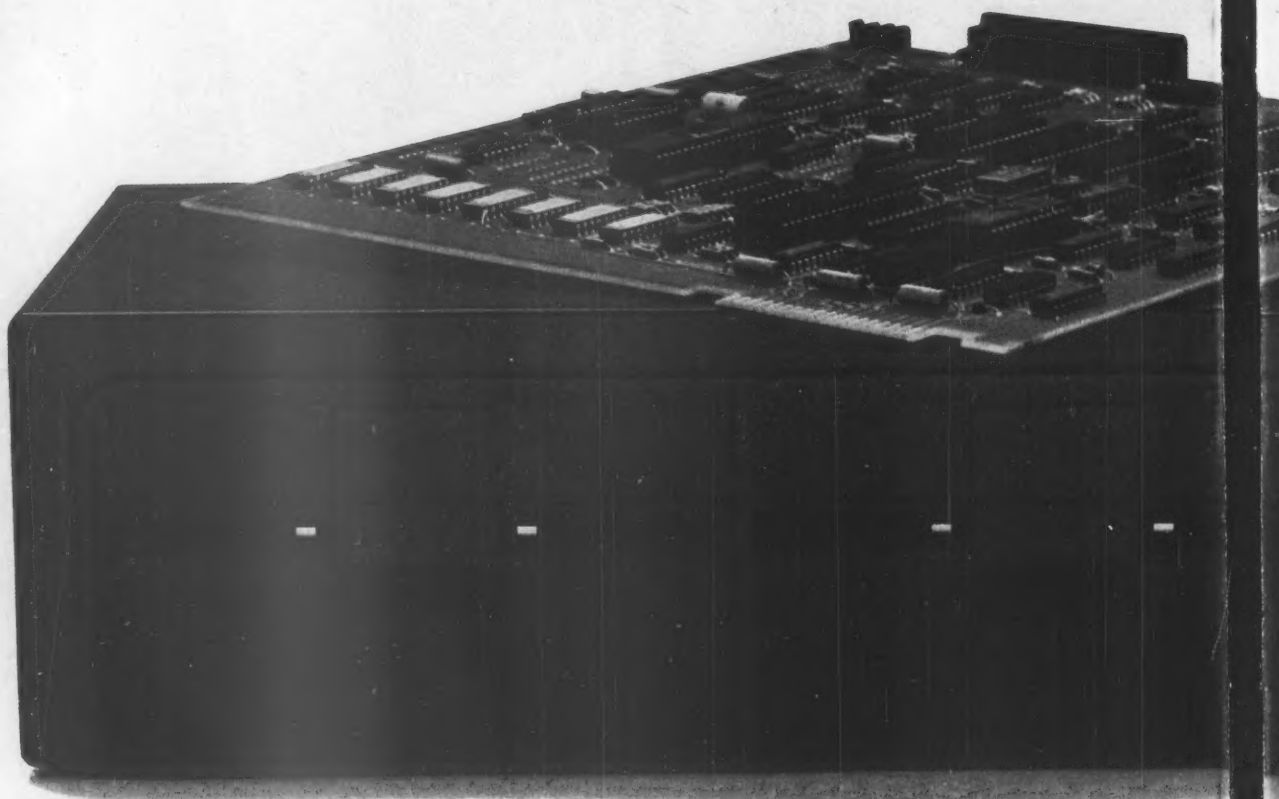
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(Continued from Page 43)

ment advisory services (MAS), which holds that an MAS practitioner must demonstrate technical competence, be financially and managerially uninvolved with the client, perform with due diligence and document the analysis and recommendations carefully and completely and provide a benefit to the client.

There is no code or professional peer review for DP consultants except for those developed by the Aicpa. On the audit side, the proce-

dures that must be followed in testing internal controls and accounting transactions in order to render an opinion are independent of who has designed the system since management is ultimately responsible for its operations.

There was never an issue of impairment of independence if an account-

LETTERS

ing firm designed a manual system; automation is merely a technological change, not a structural one. Obviously, there would be an issue of independence if the firm also marketed DP products of its own.

I think it will become necessary for the Institute for the Certification of Computer Professionals to eventually set up a mechanism beyond the Certificate in Data Processing exam to evaluate the competence of practicing DP consulting professionals, perhaps on the order of the certified management consultant, which is basically a process of peer review.

Myron S. Karasik
Veatch, Rich & Nadler
Northbrook, Ill.

CPAs and Consulting

In several recent issues of *Computerworld*, letters to the editor from individuals in data processing service firms have gratuitously observed what they deem to be an improper relationship between a certified public accountant's auditing responsibilities and his ability to serve as a DP consultant to his clients.

As it happens, none of the regulatory bodies for the accounting profession — the American Institute of Certified Public Accountants, the Financial Accounting Standards Board or the Securities and Exchange Commission — have said that an auditor cannot or should not provide DP assistance, including the development of accounting systems for audit clients.

The independence and objectivity of a professional — any professional — is a state of mind and is not impaired by a consulting relationship. If a consulting relationship impaired objectivity, no consultant could be involved in a second engagement for the same client because he would have lost his objectivity due to the first engagement.

Trying to say that CPAs should not be consultants to clients because they are too familiar with a client's operations, finances and personnel is like saying that having a family physician is a bad idea because the doctor knows the patient too well.

CPAs are required to adhere to ethical and practice standards. Apparently, some people in data processing service firms like to interpret those standards to be different than they are.

There are many CPAs who are subscribers to *Computerworld* and who believe as I do that CPAs are in the best position to be objective regarding a client's data processing needs.

Bernard H. Sirkin, CPA
Rubin, Brown, Gornstein & Co.
St. Louis, Mo.

Pretty Certificates

DP certification is not an issue for the '80s. The reader commentary by Jennifer Garland Summerlin ["DP Certification: An Issue for the '80s" CW, Jan. 25] has got it all wrong.

Summerlin imagines that "the need for some kind of regulation in the DP industry is growing more and more evident." She posits the inevi-

tablety of regulation at a time when deregulation is sweeping the nation.

Are we all so insecure that we need pretty certificates on the wall to demonstrate our qualifications? And what kind of respect would that win us? Please note that doctors and lawyers are viewed with distrust by the unruly populace.

Summerlin mentions that "utmost care is taken ... through enforcement of a strict code of ethics." Sure. That's why all doctors are competent and all lawyers are honest. Right?

Wrong. Let's face it. Professional guilds function to protect the group from the public — by hushing up most wrongdoing. Consider Summerlin's remark that "interaction with the public is treated as the delicate matter that it is."

Professional guilds also protect the established group from the individual with new ideas — creative, disruptive ideas.

Peer review puts an end to boat rocking. Note Summerlin's reference to "power to back the consensus of all its members." But what about the dissenter?

Certification is an idea whose time is gone. It never had a chance in DP anyway. This field is so constantly innovative that no body of required professional knowledge could ever be established for more than a month.

And since programmers as a breed are such a bunch of independent cusses, the prospect of their ever forming a consensus is nil.

John Enright

Chicago, Ill.

Limiting Competition

Recently you published my letter stating that DP certification would be of use only if it provided a meaningful measurement of a DPer's working skills.

Now Jennifer Garland Summerlin states in her reader commentary "DP Certification: An Issue for the '80s" [CW, Jan. 25] that we need certification to "enforce a strict code of ethics," as is done by doctors, attorneys and realtors.

The newspapers constantly print stories of doctors being sued for malpractice, lawyers violating their client's trust and realtors being involved in scams. No code of ethics will stop a dishonest person and there is no way to predict which professionals will violate the code.

Any significant violations of a code are also violations of the law and should result in criminal charges.

If insurance companies need more reassurance, the existing practice of bonding the employee has worked in the past and offers the company a chance to recover its losses.

Why don't we all admit that required certification would raise our income by limiting competition?

Can we really afford to have only as many programmers as can finish six to eight years of formal schooling as doctors and lawyers must do? Can we really ignore that any intelligent person can learn to program and many are doing so at home on their Apples and Commodores?

James L. Gillaspay
President

Paradata Southwest
Houston, Texas

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Refusing Disclosure

Ronald J. Palenski's concern over certified public accountant firms competing with his Association for Data Processing Service Organizations, Inc. clients ["CPA Firms and DP: Time for a Hard Look," CW, Jan. 25] is valid, but for the wrong reasons. If the issue was that of free competition — then let the market forces prevail.

The crux of the issue (it is wider than computer products and services) is whether the CPA firms can maintain their raison d'être — independence — from a stance of peddlers in the marketplace. If in hustling to make a buck the CPA's destroy the public's concept of them as a needed independent voice, then they will cease to be a profession.

The impropriety of selling insurance and office supplies to clients was established long ago by the profession. How are software, computer services and many management services engagements any different?

The rescission of Accounting Series Release 250 (disclosure nonaudit services) was not demanded by users of certified statements. Why did it become an issue with the CPAs? Why should a profession that lives by disclosure refuse disclosure?

Hibbard A. Smith

Tulsa, Okla.

'Tap' Operations Resource

In regard to "Operations" [CW, Dec. 28, 1981/Jan. 4, 1982], I must agree with the writer that operations personnel have almost always been thought of as second-class citizens in the data processing field.

However, I would like to let you know that there is a shop where rather than being "second-class citizens," DP personnel such as programmers are trying to get into operations. What makes this even more unique is that I work for a city government that has always had a reputation for tight budgets and being very cautious about stepping forward.

Most of the credit goes to the operations manager who had the foresight to listen to the ideas and suggestions of his operations personnel. We have seen our salaries become competitive. Instead of the only future being to advance into programming, the operations department consists of fields like production services and systems support — not just job control language, I/O and the computer room.

This gives us a much broader development path to choose from instead of feeling boxed-in.

Proof of how well this has worked is that out of 40 operations personnel only one has left to join another shop.

If anyone can relate to the article I can. I left what was one of the largest and supposedly most innovative shops in our city to work here, where in the span of less than three years I have grown from a shift supervisor to operations supervisor to operations development.

I hope other shops will take heed to "Operations" and tap that valuable resource.

Jim Slaymon
Operations Development

Marion County
Information Services Agency
Indianapolis, Ind.

LETTERS

Not a 'New Concept'

I have been hearing reports at recent computer conferences and seminars and reading various articles over the past year or so on the new, exciting concept recently developed by IBM. It is called the information center ["The First Step," CW, Dec. 28, 1981/Jan. 4, 1982].

This development certainly is interesting, but I'm a little chagrined over the matter. As the concept has been described in *Computerworld* and elsewhere, the information center is merely an emulation of a well-known service that has existed in college and university computing centers for more than a dozen years.

I think it's particularly interesting that our university computing centers long ago recognized a major problem area and developed an obvious means of coping with it. They recognized early that providing adequate access to computers for growing numbers of computer users is very difficult to do. They have also recognized that solutions which merely provide additional hardware and software do not suffice.

My chagrin develops when I think of the continuous barrage of published and verbalized criticisms to which university computer people have been subjected by people from the "real world" concerning our university programs in computing and

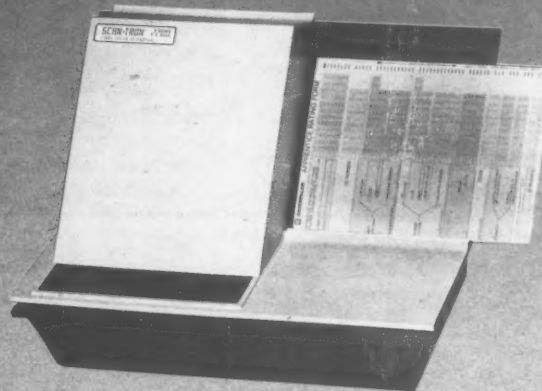
computer science and our alleged dominance of some of the major computer conferences and professional societies. The excitement now being generated by IBM among nonacademics over the new concept of information centers reaffirms my belief that in many important matters concerning modern computing, even in very practical aspects of the subject, universities and colleges are still very much on the cutting edge of things just as they were 25 years ago.

Perhaps the problem is that, in general, it takes way too long for the nonacademic computer community to learn from the academics and to understand and accept what we have developed and what we produce.

Gordon R. Sherman
Director

University Computing Center
The University of Tennessee
Knoxville, Tenn.

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Cobol Users Get Ability To Watch on Terminals As Source Code Executes

SANTA CLARA, Calif. — Cobol Animator, a product designed to enable Cobol source code to be displayed on a CRT terminal screen as it is being executed, has been introduced by Micro Focus, Inc.

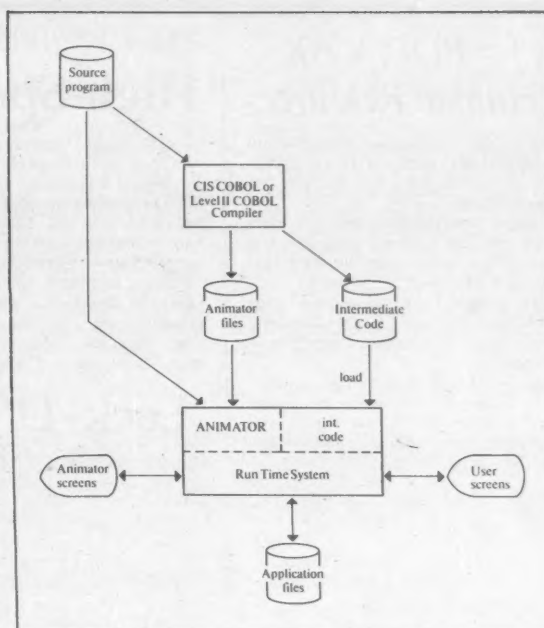
Cobol Animator operates with either Micro Focus' Ansi 1974 standard Compact Interactive Standard (CIS) Cobol or Level II Cobol compilers. The vendor said that it can be used on any Cobol source program that conforms to the Ansi 1974 standard, regardless of the original compiler used to write it.

Cobol Animator is available for use on microcomputer systems based on the Intel Corp. 8086; Zilog, Inc. Z8000; and Motorola 68000 microprocessors running under Digital Research, Inc.'s CP/M and MP/M operating systems and Bell Laboratories' Unix operating systems. It also is available for Dig-

ital Equipment Corp.'s PDP-11/44 and PDP-11/60 systems running under Unix.

Micro Focus has geared Cobol Animator for use in large management information systems shops, according to the firm's president, Paul O'Grady. He said that with the addition of an IBM 3270 emulator and whatever modifications are needed to convert the Cobol being used on the mainframe to Ansi 74 standard, source code could be downloaded from a mainframe to a microcomputer or smaller system that supports Cobol Animator.

Designed to assist debugging, maintenance and general understanding of Cobol programs, Cobol Animator enables the programmer to watch the program execute on the screen in the form in which it was written, the vendor explained. It also provides a full range of in-



System Flowchart

teractive debugging aids.

The programmer can see the logic of a program during its execution and watch its data

changing, the vendor said. The software "animates" a program by displaying its source listing on the screen and moving the cursor from statement to statement as execution proceeds.

The programmer reportedly can run the program one statement at a time, or continuously, and can watch the exact execution path. The programmer can choose the speed required for

(Continued on Page 50)

With Transparent Simulation

NAS Tool Extends MVS/SP3 to 370s

MOUNTAIN VIEW, Calif. — An MVS/SP3 simulation product from National Advanced Systems Corp. (NAS) here was designed to enable users of IBM 370 processors to extend the productive life and increase the performance of their systems.

Extend/SP System/370 Extended Facility Simulator reportedly enables IBM 370 users to take advantage of IBM's latest MVS/SP3 system control program without modifying their hardware.

The vendor described the package as a transparent simulation of the MVS/SP3 operating system that substitutes standard IBM 370 instruction-set sequences for the machine in-

structions introduced in the extended facility. It essentially is intended to substitute software for additional hardware, according to the vendor spokesman.

Extend/SP is available for all IBM 370 uniprocessor, attached processor and multiprocessor systems, including the 158 and 168 models, the vendor said. It is said to increase system performance by as much as 12% without the addition of memory.

U.S. prices of Extend/SP range from \$5,000 to \$15,000, depending on the IBM 370 configuration. Deliveries are scheduled to begin this month.

National Advanced Systems is

located at 800 E. Middlefield Road, Mountain View, Calif. 94040.

Packages to Gain MVS/SP3

SUNNYVALE, Calif. — Support for IBM's MVS/SP3 operating system will be included in Boole & Babbage, Inc.'s 1982 enhancements to Comprehensive Management Facility (CMF) software monitor and Resolve, its real-time diagnostic package, the firm announced.

Releases of CMF and Resolve incorporating SP3 support will be available for general distribution early in second-quarter 1982. In addition to SP3 sup-

port, Releases 1.7.0 of CMF and 4.7.0 of Resolve also will support IBM 3081 processors and 3380 direct-access storage devices, the vendor said.

Cost of a perpetual license for CMF with MVS/SP3 support ranges from \$10,000 to \$27,500; Resolve ranges in price from \$10,000 to \$17,500. The purchase price includes one year of product maintenance, the vendor said from 510 Oakmead Pkwy., Sunnyvale, Calif. 94086.

IBM's RMF "126% Off Mark" CW Reports. QCM Needed!

1/19/81 . . . Two independent studies reported by Computerworld noted that IBM's Resource Monitoring Facility (RMF) monitoring of CPU and I/O

utilization "suggests discrepancies," "severely underestimates," and can cause "inaccurate estimating" of proposed enhancements up to 126%!

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SPM-Systems Performance Module: Provides management reports for diag-

nostic performance measurement, capacity planning and fine tuning.

SPI-Systems Performance Interrogator: An online performance and analysis facility for operator and TSO consoles. Contains powerful exception reporting facilities.

JAB-Job Analysis and Billing: Most accurate and repeatable accounting and billing system available. Uses QCM methodology to supplement SMF. Flexible allocation and cost distribution.

BCO-BYTE/SIO Counting Option: Directly counts I/O's and the number of bytes transferred at the job, device, channel and control unit levels—a necessary requirement for anyone seriously concerned about capacity planning, accountability, and system tuning.

SDSI-Shared Data-Set Integrity

SDSI solves the problems of sharing data between two or more computer systems. It overcomes data integrity problems and reserve lockouts on shared DASD, without requiring system or program modifications.

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Package for PDP, VAX Manages Human Resources

WELLESLEY, Mass. — An on-line, real-time Human Resource Management (HRM) package for users of Digital Equipment Corp.'s PDP and VAX series was announced here by Cortex Corp.

The package includes a report-writing function, data and 40 standard reports that are available via screen terminal or high-speed printer and a query function that can provide customized data and ad hoc reports.

The HRM system was designed to provide answers for analyzing costs and human resources. It is a table-driven system that enables users to maintain a specialized organization of information.

Because the package is integrated, a change or addition in information occurring in one place in the system automatically occurs in other places, the vendor explained. The HRM package reportedly can run five separate or consolidated on-line, interactive modules depending on the client's need for limited or comprehensive services. These modules are applicant, administrative, government reporting, pension and benefits and payroll interface.

The HRM package is available for \$40,000. The modules are priced separately from \$5,000 to \$10,000. Cortex is at 55 William St., Wellesley, Mass. 02181.

'Qsort' Written in Macro

High-Speed PDP-11 Sort Updated

DETROIT — Version 2.01 of Qsort, a high-speed sort for Digital Equipment Corp. PDP-11 systems running under CTS-500 and RSTS/E, was introduced here by Advanced Software Products.

Written in macro, Qsort is said to be reentrant and to be callable from any language that supports "core common." It requires a minimum

of space for temporary files and on "in-place" sorts utilizes only 1.2 times the original file for work space, according to a vendor spokesman.

Qsort reportedly allows the user to select the device that is utilized for work space and to allocate the most efficient cluster size to ensure minimum disk activity.

The software was designed to operate on string Ascii files, the vendor said, and is particularly suitable for users of Dibel on the CTS-500 system.

Version 2.01 of Qsort is available for \$1,200 from Advanced Software Products at Suite 291, 28690 Southfield Road, Lathrup Village, Mich. 48076.

'Lock-11' Secures RSTS Systems

SOUTHAMPTON, Pa. — A security and system management package for users of Digital Equipment Corp. PDP systems running under RSTS was announced here by Nationwide Data Dialog, Inc.

Lock-11 reportedly was built upon the standard RSTS password structure. Its features include control of system access by keyboard, real-time system surveillance and automatic login (with or without password).

With Lock-11, password knowledge is no longer carte blanche system access, the vendor said. The system detects unauthorized use of passwords. Privileged passwords do not work on non-

privileged keyboards and nonprivileged passwords work only on specified keyboards.

Manager's Capabilities

A manager reportedly can establish special priority/burst settings by K byte. The manager also can establish default output protection code, at assignment, and up to three specific user logicals for each K byte. The vendor said the manager also can specify a list of console keyboards from which the security file editor may operate.

A macro Dynpri program is included with Lock-11, which is said to dispatch users into 10 separate priority queues, separately tunable

on-line.

The program detects hibernating jobs and announces the facts on Alarm keyboards, the vendor said. It also produces almost no load in operation and runs in 5K words, a spokesman said. The program was designed to hold up to 14 files open for performance purposes.

Any valid RSTS/E system running Version 7.0 or later versions can support Lock-11, the vendor said, noting that any version of RSX emulation is needed. The single CPU license is \$950. Annual maintenance is 12% of the current list price.

Nationwide Data Dialog is located at 70 James Way, Southampton, Pa. 18966.

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Cobol Code Displayed as Executed

(Continued from Page 49)
reading and comprehending the program. The program also can be run normally, in which case only the user displays are shown, and then switched back into animation mode at any time, the vendor continued.

Cobol Animator's interactive debugging capabilities were designed to enable the programmer to set execution breakpoints and change the path of execution at will to omit or repeat parts of the program.

At any stopping point, the programmer can query the value of a data item by moving the cursor to it and issuing a command. The value of an item also can be monitored, with its value displayed after executing each program statement.

Reduces Printouts

Cobol Animator was designed to remove the reams of printout generally associated with "walkthroughs" and debugging of Cobol programs. The package shows the programmer the actual statements executed in a particular logical path through the program, the vendor explained, and can enable a program to be enhanced or debugged by a programmer who may or may not have

been involved in the original program development.

Pricing for Cobol Animator, in combination with either CIS Cobol or Level II Cobol, is \$1,000/mo, regardless of the number of systems that will be running the software, O'Grady said. CIS Co-

bol plus Cobol Animator is available immediately and delivery is in 30 days. Level II Cobol plus Cobol Animator will be available in 90 days.

Micro Focus, Inc. is located at 1601 Civic Center Drive, Santa Clara, Calif. 95050.

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Salcris System Protects Against Software Piracy

BIRMINGHAM, Ala. — A system designed to provide protection against software piracy was introduced here by Salcris Corp.

The Chrono-Guard Software Marketing System includes a hardware device that reportedly can operate on any system with an asynchronous RS-232C interface. It is said to make it possible to demonstrate software, lease it for short periods or charge for it on a per-usage basis, all with protection from piracy.

When a software publisher registers a product with the Chrono-Guard system, Salcris Corp. assigns a secret code unique to the software product. After the software is modified using this secret code, it reportedly will only function in conjunction with an appropriate number that is known as a "key." This key contains the secret code assigned to the software product in an enciphered message.

Hardware Lock

Only Salcris Corp. will be able to encipher this message; and only a hardware "lock" attached to a particular customer's computer can decipher the message. The vendor stressed that identical copies of the product can be freely distributed, but no one will be able to use a copy without a key.

Whenever a user purchases a key (for \$300), the software developer will receive reports from Salcris Corp. detailing the software product, the dealer, the user, the period of time during which the key is functional and the

Cobol Routines Out for DPS 6, Level 6 Users

PHOENIX — Independent Computer Systems, Inc. (ICS) has announced Cobol runtime routines to assist users in the design of applications software for the Honeywell, Inc. Level 6 and DPS 6.

The ICS Cobol runtime routines when used with the Honeywell MOD400 are said to eliminate the need for execute command file and Cobol overlays. Modules allow Cobol programs to pass arguments on the command line, access MOD400 files, pass linkage sections between tasks and execute user commands, the vendor said.

The software, requiring Honeywell's Gcos MOD400 operating system, is available as part of the ICS Toolbox, a set of 120 utilities and subsystems priced at \$7,500. The vendor is located at Suite 106, 8686 N. Central, Phoenix, Ariz. 85020.

number of times the program is used, if this option is applicable. This provides a means of controlling the use of software since keys are only issued to dealers authorized by the publisher and are only good for specified periods.

Installations can use products under the Chrono-Guard Marketing System in several ways, the vendor explained. They may lease it

for a short period of time; lease it for a long period of time; or use it periodically and only be charged for it on a per-use basis.

User Payments

Salcris Corp. supplies users with the required lock device and is paid for this hardware directly by the user. All other payments are for the service of issuing keys and reports and are due from the

software publisher entering into the software registration agreement with Salcris Corp.

The lock and user's guide is available to end users for \$300. For the software publisher interested in becoming involved with the Chrono-Guard system, initial one-time costs include \$50 for utility executable code, \$100 for utility source code, \$200 for prototype registration, \$200 for one-shot registration.

tration, \$100 for production registration, \$50 for documentation set and \$10 for a document.

Any required consultation, for example for modifying a software product for compatibility with the software marketing system, is an additional expense, charged at a nominal hourly rate.

Salcris Corp. is headquartered at 1 Office Park Circle, Birmingham, Ala. 35223.

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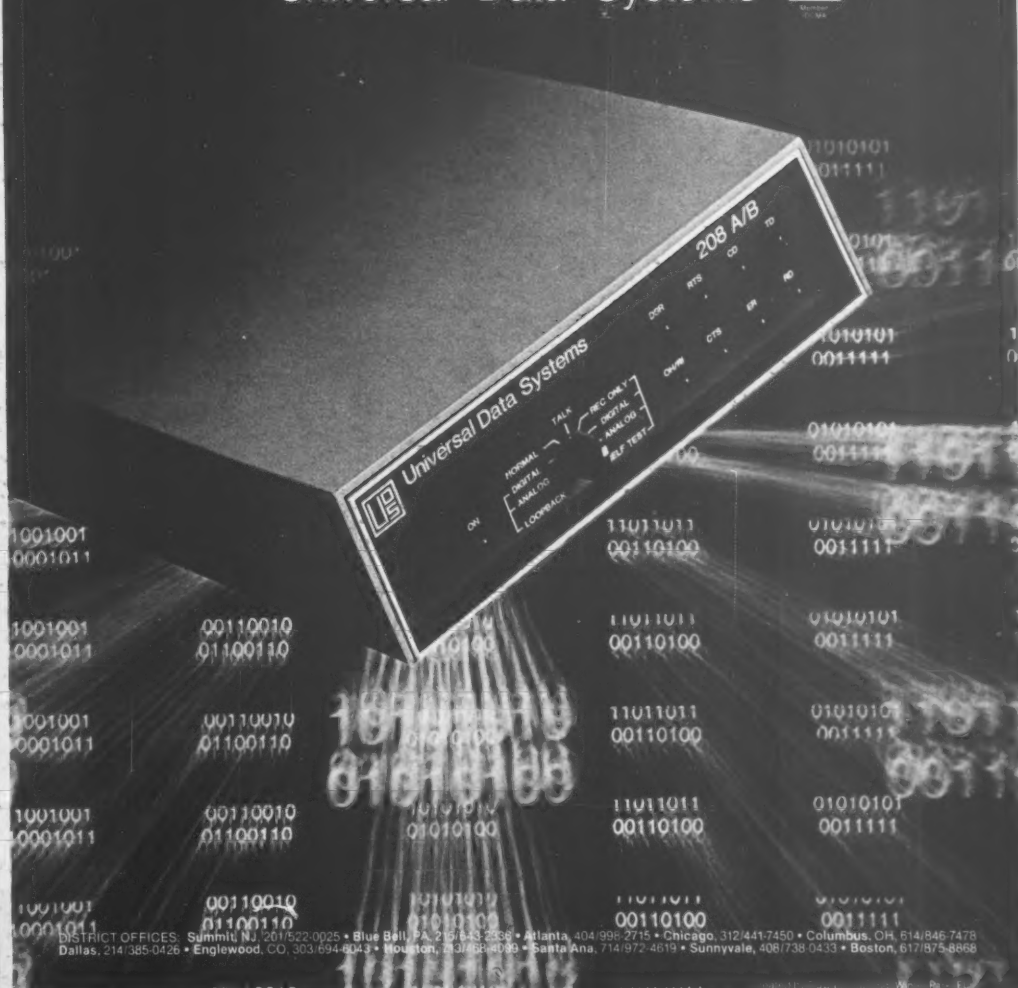
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To Accommodate Academia Amdahl Cuts Price on Unix Version

SUNNYVALE, Calif. — Amdahl Corp. has cut by twofold to threefold the price of its modified version of AT&T's Unix operating system. The reductions signal the beginning of a two-tiered Amdahl pricing structure — which for the first time will allow users in academic environments to purchase the vendor's Unix-based product for a lower price than customers in the commercial community.

Under the revised pricing scheme, which took effect about three weeks ago but is only now being made public, the Amdahl program offering costs \$1,000/mo for academic users and \$1,500/mo for their commercial counterparts, according to the firm's software marketing manager, John Mangold. Previously, the same Unix-based operating system cost both classes of users exactly the same — \$3,000/mo.

Introduced last June 1, Amdahl's software offering combines Unix Version 7 with a compiler that adapts

the operating system to IBM's 370 architecture. Although the product retains Unix's commands and basic framework, it incorporates several features not originally available from AT&T.

Some of those features include a file backup and recovery capability and 370 peripheral-support aids like a full-screen editor. Other additional features of Amdahl's Unix look-alike include assorted interfaces to MVS and VM, Mangold said.

Amdahl is located at 1250 E. Arques Ave., Sunnyvale, Calif. 94086.

Upkeep Tool Fits Eclipses, 8100, 4300

HOUSTON — An on-line maintenance planning and support package for Data General Corp.'s Eclipse series and IBM's 8100 and 4300 equipment was announced here by Bonner & Moore Consulting Services.

Compass reportedly provides on-line support for the maintenance of process manufacturing and power plants. Its integrated modules include facilities for warehousing, inventory, storage and spare parts management, purchasing, equipment records, work order processing, preventive maintenance, equipment history and work order planning and scheduling.

The vendor said the package originally was designed for the DG Eclipse series and the entire Compass system is available for that machine for \$125,000, with an additional 10% annual maintenance fee. The warehousing and inventory modules are available for the IBM 8100 and 4300 for approximately \$67,500 and an additional 10% annual maintenance fee. However, Bonner & Moore expects the entire package for the IBM equipment to be completed in July, with the appropriate interfaces.

Bonner & Moore is located at 2727 Allen Pkwy., Houston, Texas 77019.

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Qantel Updates Best, Adds Quotation Module

HAYWARD, Calif. — Mohawk Data Sciences Corp.'s Qantel Division has announced the addition of a quotation module for its material requirements planning package for manufacturers, a remote support system for its users and a new version of its Best operating system.

The quotation module reportedly allows the user to create a quotation for multiple quantities and then automatically creates the item masters and bills of materials. The order then can be released for the desired quantity. In addition, an existing bill of material, part number or routing can be modified on-line as necessary. An existing quotation similar to the one being prepared can be merged and then modified.

The quotation module is available for \$6,500.

The remote support system is intended to enable MDS Qantel and its distributors to remotely support and maintain customer applications software. Originally designed to provide support for Qantel's manufacturing software package, the remote system is said to enable Qantel computers at the firm's corporate headquarters to directly interface with customer systems throughout the country to provide procedural assistance, applications software testing, problem investigation and analysis and new software release and distribution.

The remote support system is available for \$100/mo per Qantel system.

The distributed version of Qantel's Best operating system is called Best/Net. Its major feature is said to be fully transparent intersystem data file access for users of any of the systems in a Qantel distributed network. Best/Net reportedly uses a

high-speed, 500K byte/sec data communications controller to connect up to 16 independently configured computer systems in a single, multidrop distributed network. The maximum total physical separation for the systems on the network is 3,000 feet.

The Best/Net operating system is available to Qantel users who purchase the controller board for \$5,950, the vendor said from 4142 Point Eden Way, Hayward, Calif. 94545.

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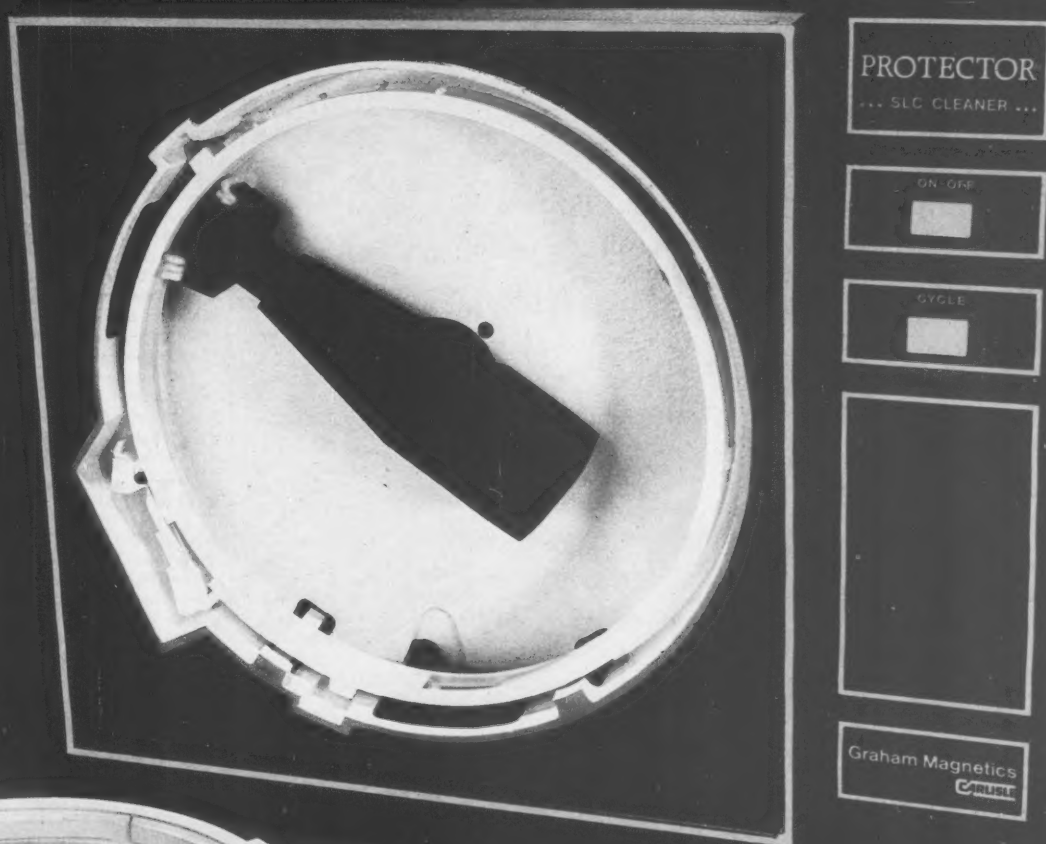
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The three to five-day training sessions will be offered either at SGA's facilities or at customer's offices. The cost per person is \$550 and group rates are available, the vendor said.

Software Guidance is located at 45 W. 27th St., New York, N.Y. 10001.

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Screen Utility Runs on DEC's

BURLINGTON, Mass. — Interactive Systems, Inc. has announced a screen report utility for users of Digital Equipment Corp. VAX-11 superminicomputers and Decsystem-10 and Decsystem-20 processors.

The software utility is designed to let the user view portions or page extracts of line-printer bound output before the data is sent to a printer. Since the utility dynamically selects portions of the output's 132-col width, it can be used with a standard 80-col-wide CRT terminal, the vendor said.

The utility costs \$3,000 and is available from Interactive Systems at 131 Middlesex Tnpk., Burlington, Mass. 01803.

Development Aid Fits RSTS/E

HINSDALE, Ill. — Dataguard Corp. has announced software said to reduce development time for Basic+2 users of Digital Equipment Corp.'s RSTS/E Version 7.0 operating system.

Program Building Blocks were produced in Macro-11 (assembly) and are available in the following areas: video screen functions, screen function generators and data manipulation, a spokesman said.

Base price for a single CPU license is \$700 including a one-year warranty. The firm is located at 15 Spinning Wheel Road, Hinsdale, Ill. 60521.

Development Utility Set Bows for Wang VS Systems

SEATTLE — An integrated set of utilities designed to reduce software application development time on Wang Laboratories, Inc.'s VS systems was developed here by The Office Manager, Inc.

Designated Speed II, the programs are said to be an enhanced version of the Speed utility the firm created for the Wang 2200 series. Reportedly, Speed II is self-documenting and able to reduce the initial development time, as well as the time required to modify, enhance and document applications.

Speed II is designed to be integrated with external code in any Wang-supported language, including Co-

bol, Basic, RPG-II and assembler. Because it uses standard Wang files, no conversion is required from existing systems, the vendor said. All Wang-supplied programs and utilities can be used with Speed II-based systems.

The Speed II utility will be available by March. Its pricing is between \$5,000 and \$60,000, depending on the configuration, the vendor said. The Office Manager can be reached at P.O. Box 66596, Seattle, Wash. 98166.

Diebold Unit Offers ATM Aid

CANTON, Ohio — A computerized automatic teller machine (ATM) reporting system has been announced by the Total Automatic Banking Systems (Tabs) Advisory Group (TAG) of Diebold, Inc.

The TAG National Reporting System is a management system said to enable institutions to effectively measure the performance of their Tabs ATM network. Participating institutions maintain daily logs summarizing ATM system performance statistics, customer availability and transaction volumes.

A one-time initiation fee for TAG members is \$250 and for nonmembers is \$500. The monthly processing fee for members is \$25 and for nonmembers is \$50. Input costs vary according to method and volume of input, a spokeswoman said. Diebold can be reached through P.O. Box 8230, Canton, Ohio 44711.

Package Handles EFT/ATM Nets

ORLANDO, Fla. — An electronic funds transfer/automatic teller machine (EFT/ATM) software system has been announced by Florida Software Services, Inc.

The on-line monetary transaction system is designed to interface with the company's Central Information File System and reportedly supports all vendor models of ATM.

EFT/ATM features a card management system including initial solicitation, issue/reissue processing, card replacement and personal identification number processing.

The package costs under \$15,000 from the firm at P.O. Box 2269, Orlando, Fla. 32802.

Surgical Package Tied to System/34

CENTERPORT, N.Y. — A software package for surgical dealers, usable on the IBM System/34, has been announced by Medi-Star Systems, Inc.

DME/34 includes billing, accounts receivable, inventory control, mailing label printing and management reports. Vital information is said to be available immediately either on the video screen or printed out.

DME/34 costs \$12,000. The firm is located on Mill Dam Road, Centerport, N.Y. 11721.



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Data Base to Contain Original Research Data

NEW YORK — Scientists will reportedly be able to access original research data from many disciplines almost immediately from a computerized on-line service scheduled to begin operation soon by Comtex Scientific Corp.

According to Dr. Frederick Plotkin, the company's president, it sometimes takes as long as 18 months for a scientist's research to be put into article form and published in one of the scholarly journals. "Information in this field becomes stale quickly," he added. A data base on research material is in the process of being built at Comtex and the company expects it to be fully complete in about a year.

Research Reviewed

The method in which Comtex receives research material is conventional. Scientists send the company their findings, which then are handed over to an editor responsible for a particular scientific series or discipline. The material is then reviewed by a board of peers to determine its merit. If it meets the stan-

dards, it is entered into the Comtex data base. According to Plotkin, the information is then digitized and stored in an IBM Series/1 minicomputer.

Microfiche or printed output is produced and made available to interested scientists or subscribers to the system within six to eight weeks after research is completed, Comtex said.

Plotkin said that when the

system goes on-line, sometime in the fall, scientists will be able to tap it by using their own terminals. He said that 95% of the terminals currently available will be compatible with the system using Telenet and conventional phone line communications.

Editorial Advisory Board

Among Comtex's editorial advisory board members is

Dr. Marvin Minsku, editor-in-chief of the artificial intelligence series, who is a professor at MIT's Artificial Intelligence laboratory. Minsky has agreed to supply the Comtex data base with all of the data on artificial intelligence accumulated in the past at MIT as well as supplying immediate research on the subject, Comtex said.

Comtex also plans to offer a Toxicity Prediction service

this spring. This on-line service will allow users interested in how untested chemical compounds react in terms of toxic or carcinogenic affects. Comtex said the service was produced by developing a biostatistical computerized model, which included chemical structure data and their interactions.

Comtex is located at 850 Third Ave., New York, N.Y. 10022.

IBM Series/1 Gets Enhancer

DENVER — Colorado Business Computer Systems has announced an IBM Series/1 EDX operating system enhancer.

The EDX enhancer includes a modified version of the IBM session manager said to allow many users to run input programs written in EDL in a small partition without using IBM's multiple terminal manager.

The EDX enhancer may be licensed for a monthly fee of \$20 from the firm at Suite A2, 6444 E. Hampden Ave., Denver, Colo. 80222.





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CW 2/15/82



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Identifies Requested Overlays Updated 'SRF' Monitor Released

RIVERDALE, Md. — Gejac, Inc. has announced a new release of its SRF performance and capacity monitor for Digital Equipment Corp. PDP-11 computers running

under RSX-11M and RSX-11M Plus.

Version 2 of SRF reportedly can identify how many overlays a task requests to help management have optimum

program design. SRF provides information on CPU utilization, pool usage and fragmentation, check-point activity, I/O, task loader, shuffler activity, device usage and memory in summary and graphics reports, according to the vendor.

Version 2 is free to SRF users; SRF for RSX-11M users costs \$2,995 and RSX-11M Plus costs \$3,495. Gejac can be reached through P.O. Box 188, Riverdale, Md. 20737.

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Maestro Release 4.0 Offers Cobol Code Generator

SAN FRANCISCO — Softlab Systems, Inc. has introduced a Cobol code generator in its latest release of the Maestro software development system.

Maestro 4.0 is said to generate executable Cobol code from pseudocode that represents the logical structure of the program. The pseudocode is produced from an interactive dialogue between the system and the user.

The system also generates a logic flow diagram from the design dialogue, which is embedded in the code in the form of comments, a spokesman said.

The upgrade to Release 4.0 is free to users of Maestro, a turnkey system. A 24-terminal Maestro system can cost between \$230,000 and \$280,000, a spokesman said from Suite 200, 24 California St., San Francisco, Calif. 94111.

On-Line System Designed For Investors With HP 3000s

NEW YORK — Greer Sonntag Associates, Inc. has introduced Investron, which it describes as a real-time, on-line computer system for the investment community that runs on Hewlett-Packard Co. HP 3000 systems or on the vendor's own time-sharing network.

Investron is intended for use by independent advisors, banks, insurance companies, mutual funds, brokerage firms and other institutions responsible for managing and/or monitoring assets, according to a vendor spokesman.

The operating system is

modular in design and is priced from \$100,000 to \$250,000, depending on the options the user selects. On a time-sharing basis, the pricing is based on a combination of storage and transaction usage, the vendor said from 6 E. 45th St., New York, N.Y. 10017.

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RAMIS II operates on IBM 360, 370, 43xx, 30xx series and plug-compatible computers and with all major operating systems, and RAMIS II applications are completely portable across all IBM operating environments.

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Mathematica Products Group/ Box 2392/ Princeton, NJ 08540

CW-6

Screen, Library Utilities Offered for System/34

AMARILLO, Texas — DBA Systems, Inc. has introduced four packages for screen and library handling for IBM System/34 users.

DBA-1 is designed to screen catalog information for each file and library residing on disk. It reportedly can be used to check the status of a file at any time. It is available for \$75.

DBA-2 is a utility that is intended to stop all procedures in a specific library from logging the statements to the system's history file, the vendor said.

Language For Modeling On T/S Network

HANOVER, N.H. — A financial modeling language that can be used to generate custom-made applications systems is available through the DTSS, Inc. time-sharing service.

Available on a remote computing and license basis through the firm's Associates Plan, Model is based on an English-like command structure and can be translated into other languages by changing command language tables, according to the vendor.

Model has analytical, mathematical, graphics, editing and report generator capabilities, a vendor spokesman said. It is charged on an as-used basis from DTSS, 10 Allen St., Hanover, N.H. 03755.

The start, stop and console messages are still logged, but the individual procedure statements will not be written to the history file. This will reportedly reduce disk read verifies and disk writes. DBA-2 is priced at \$50.

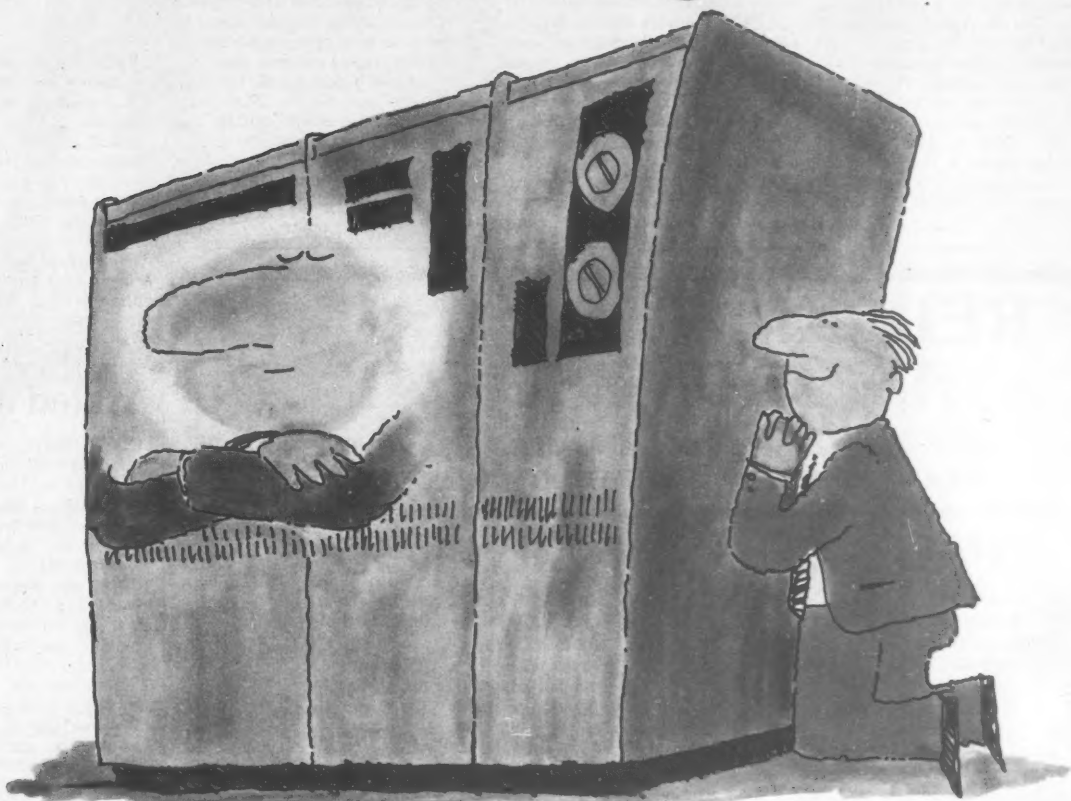
The third utility, DBA-3, is designed to save user and IBM language libraries residing on disk, with no operator intervention. The procedure reportedly writes to the magazine drive, eliminating the need for the operator to count magazine slots in order to fully utilize all 10 diskettes in a magazine. The second part of this system will condense all user and IBM language libraries with one procedure, the vendor said. Both procedures read the library control sector directly to obtain the needed information.

DBA-5 is said to read a library and produce a set of reports that documents the files, programs and procedures in the library. A flowchart of the procedures is produced, in addition to a cross reference by program and procedure. Another report documents each file used in the library. The documentation package is said to read any procedure statement without any restrictions concerning the length of the file names. It is priced at \$100.

DBA can be reached through P.O. Box 2068, Amarillo, Texas 79105.

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CW 0215

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'Access' Eases NCR Extractions

CINCINNATI — Capricorn Computing, Inc. has introduced software to facilitate the extraction of data from NCR Corp. disk or tape spool files.

Access is said to work sequentially through a spool file, handing the user program one print line at a time. The decrypted print lines can then be used, for example, for remote, slave or local printing, microfiche tapes and screen displays.

A perpetual license fee for Access is \$1,500, with rental terms available. The exclusive sales agent for Access is The Software Clearing House, 771 Neeb Road, Cincinnati, Ohio 45238.

Biomedical DP Package Out For Prime Series 50

SAN RAFAEL, Calif. — Systems Applications, Inc. has unveiled the Biomedical Data Processing (BMDP) statistical package for the Series 50 of Prime Computer, Inc. equipment. Eight new programs have been added to the library for a total of 40.

The new routines include Box-Jenkins analysis, Boolean factor analysis, Cox survival analysis, general analysis of variance and linear preference scores. The Prime version has been enhanced with a user-friendly interactive front end, according to the vendor.

This front end interrogates the user and assembles a command file that is submitted by software to the Primos

interactive, phantom or batch job processors. Optional accounting software can be enabled in the front end for systems that utilize chargeback schemes. BMDP problem sizes can reportedly be expanded dynamically by utilizing command options available in the BMDP control language. There is no need to recompile source code to expanded problem sizes.

The annual license fee for commercial users and service bureaus is \$2,250. The fee for nonprofit and governmental users is \$1,500 and for educational institutions the cost is \$750/year, the vendor said from 101 Lucas Valley Road, San Rafael, Calif. 94903.

UCC Net Adds 'BMDP'

DALLAS — University Computing Co. has announced the availability of the Biomedical Data Processing System (BMDP) for data description and statistical analysis.

BMDP is a library of three dozen computer programs. One set of English instructions is used for each data set analysis, according to the vendor.

Statistical analysis features include regression analysis, Box-Jenkins time series analysis and frequency table analysis.

Other features are repeated measures analysis of variance and covariance, nonlinear regression, discriminant analysis, logistic regression and cluster and factor analysis, the vendor said.

The package is available on a time-sharing basis from the vendor, 1930 Hilene Drive, Dallas, Texas 75207.

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Time-Sharing Added to Dbos

CINCINNATI — Sentinel Computer Corp. has introduced an expanded version of its Data Base Operating System (Dbos) that reportedly adds time-sharing to the functional offerings for its 16-bit microprocessor-based systems.

Dbos was designed to simultaneously support multiple on-line users in a multiprogramming/multi-tasking environment. It also provides a data base management file structure and supports multiple languages, the vendor said.

The package is partitioned into modules that are individually optimized, the vendor explained. These include multitasking executive, memory manager, data base manager, interpreter, terminal manager, print handler/spooler and communications.

All programs are said to be reentrant to maximize memory utilization, the vendor added.

Retailing for less than \$4,000, the Dbos operating software is available from Sentinel Computer, 9902 Carver Road, Cincinnati, Ohio 45242.

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APL

A PROGRAMMING LANGUAGE

• *Jack Rochester's interview with Ken Iverson, inventor of APL and author of A Programming Language, gives us a first-hand look at the man, his work and his environment.*

Begins on In Depth/2

• *How marketable is APL? As Raymond Jordan explains, the language started off with some handicaps, although it proved fabulously productive in terms of programmer time.*

Begins on In Depth/11

• *Three case studies show us APL in successful financial applications: at Southern Co. of Atlanta, Continental Telephone Corp. of Atlanta and the Sybron Corp. of Rochester, N.Y.*

Begins on In Depth/14

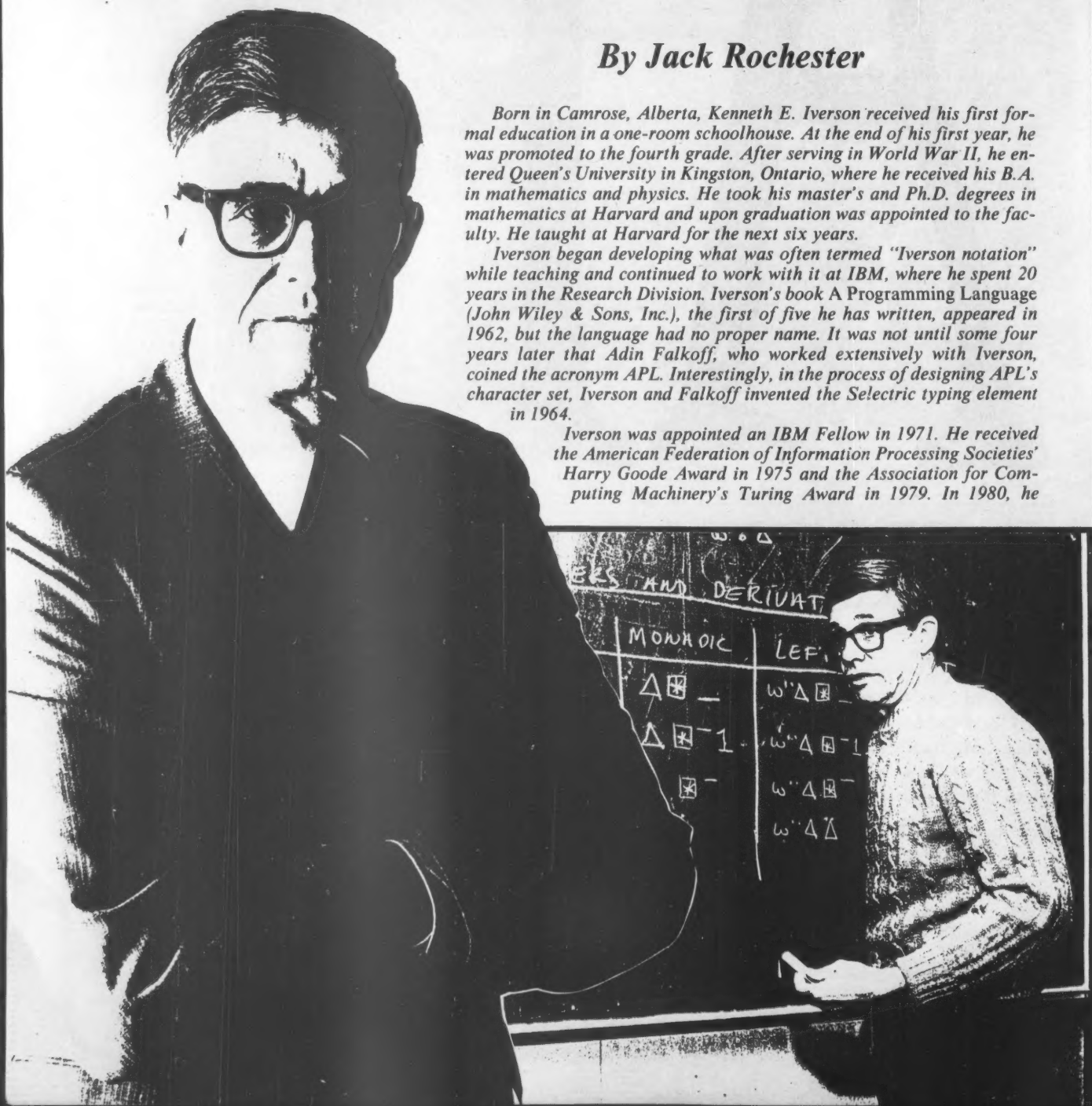
Ken Iv

By Jack Rochester

Born in Camrose, Alberta, Kenneth E. Iverson received his first formal education in a one-room schoolhouse. At the end of his first year, he was promoted to the fourth grade. After serving in World War II, he entered Queen's University in Kingston, Ontario, where he received his B.A. in mathematics and physics. He took his master's and Ph.D. degrees in mathematics at Harvard and upon graduation was appointed to the faculty. He taught at Harvard for the next six years.

Iverson began developing what was often termed "Iverson notation" while teaching and continued to work with it at IBM, where he spent 20 years in the Research Division. Iverson's book *A Programming Language* (John Wiley & Sons, Inc.), the first of five he has written, appeared in 1962, but the language had no proper name. It was not until some four years later that Adin Falkoff, who worked extensively with Iverson, coined the acronym APL. Interestingly, in the process of designing APL's character set, Iverson and Falkoff invented the Selectric typing element in 1964.

Iverson was appointed an IBM Fellow in 1971. He received the American Federation of Information Processing Societies' Harry Goode Award in 1975 and the Association for Computing Machinery's Turing Award in 1979. In 1980, he



Iverson

joined the APL Development Group at I.P. Sharp Associates, Toronto, a worldwide time-sharing firm. At I.P. Sharp, Iverson has developed "A Working Introduction to APL," a multimedia, hands-on course that gives the learner a working knowledge of the language in three days. He is apparently ever the teacher; he is also an adjunct professor in the Department of Computer Science at the University of Guelph.

Even in this world of overnight successes and fast-rising superstars, it is a rare person who has an entire movement devoted to his invention. In addition to Iverson's own books, many others have been published on APL. The language is the subject of three special interest groups — sponsored by the ACM, Scientific Time Sharing Corp. (STSC) and I.P. Sharp. (for more information on books and groups, see accompanying articles). IBM has a major commitment to APL, and many other vendors are deeply involved in its application. APL, though far from enjoying the proliferation of Cobol or PL/I, is here to stay.

Yet Iverson neither boasts nor bellyaches about his life's work. He is an unpretentious, thoughtful man whose main concern is making computers and humans more compatible. When I arrived at the Toronto offices, he greeted me personally. We poured our own coffee in the lunchroom. His office was

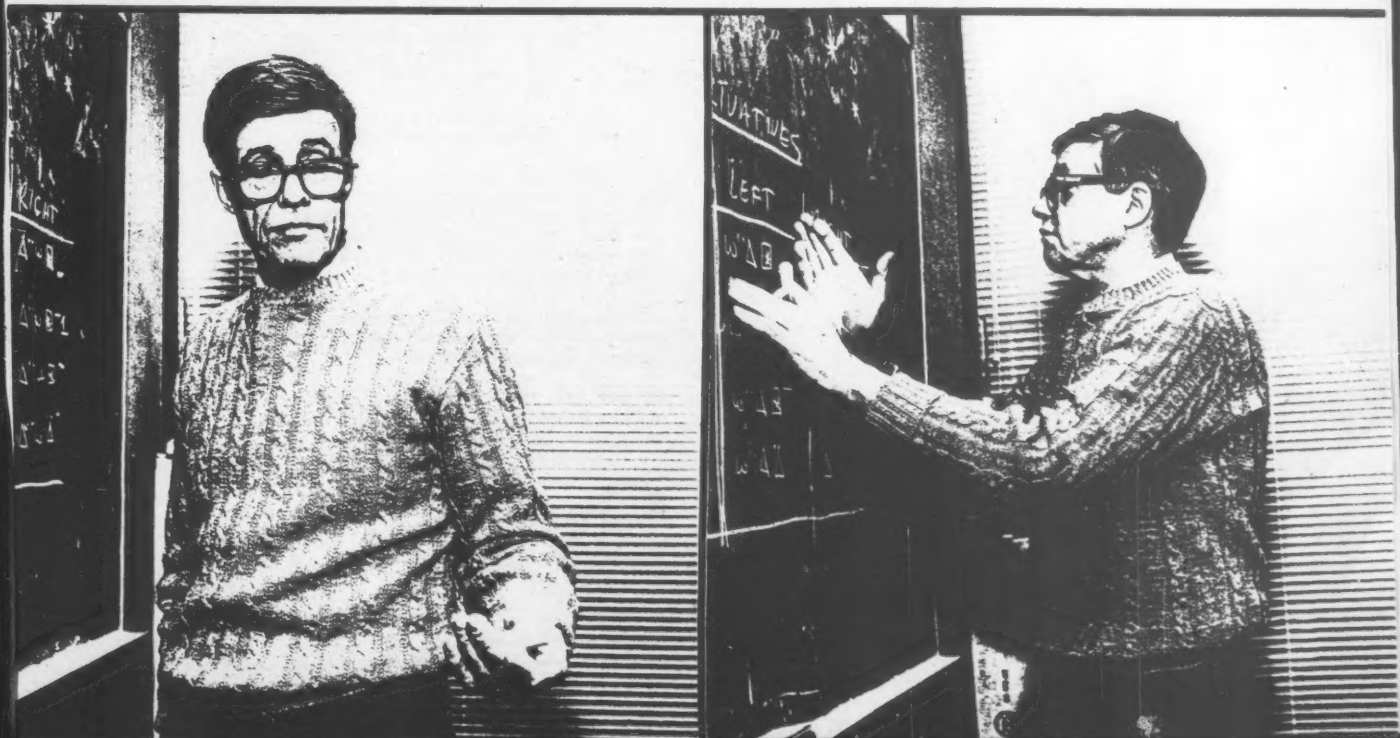
simple, neat, clearly a place where the man worked. Time and again he would jump up from his chair and explain things at the blackboard.

At the end of the interview, Iverson packed up for a four-hour drive to a small high school, where he was to demonstrate APL on a microcomputer the next day. I was curious — as curious as his young audience would be — to learn how Iverson had invented a language.

When did you begin to develop APL?

I was one of the junior faculty appointed at Harvard when Professor Howard Aiken established his pioneering program in Automatic Data Processing in 1955. I was teaching a graduate course in computer science and found I needed notation for teaching, as well as for the book I was writing with Fred Brooks [*Automatic Data Processing*, John Wiley & Sons, Inc., 1963]. I was working with sorting theory and found, somewhat to my surprise, that some of the things I thought of as notational tools were very useful in teaching operations research.

Is this in any way similar to simplifying equations in mathematics?



RESEARCH



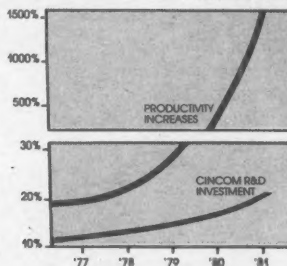
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Yes and no. A background in English may be the most useful training of all. However, mathematics is the best-developed discipline in which one really uses the language — the notations — deliberately for thinking. In a sense, that's the virtue of our natural language. The only way you can think clearly about complicated things is by putting them into language. You write it down, then you read it to see what you said and see if it's what you intended to say.

How did other languages become so complicated?

Partly because of the design of early computers and partly because the languages were based on linear algebra. In most languages, you can trace back all these things, such as declarations and so on, to the limitations of the early machines. But once having done this, people fall in love with these things. People who are used to the declaration, which strikes me as an absolute pain in the neck, now can't live without it. And that's why these things get perpetuated.

How, then, did APL come about?

I wasn't trying to design or implement a language for a machine. In my writing and teaching, I found it necessary to supplement the machine and assembly language used to communicate with computers by notation suited for the communication of complex formal procedures between people.

Independent of the machine?

That's right. But that's not to say I wasn't conscious of the machine. In fact, we prepared a relatively complete description on the IBM 360, in APL, without ever having an implementation.

Then you continued developing APL at IBM?

I joined IBM in 1960, where I worked with my long-time colleague, Adin Falkoff. We finished the description of the System/360 in 1964, then started turning our attention to an implementation. You see, in the System/360 description that Falkoff first undertook, the intent was to provide another sort of monitor for the uniformity of the machines. In System/360, the concept was to design an entire line of machines, from the very small to the very large, which all used the same machine language. So in effect, in designing System/360 what they did was to design a language.

APL was to be formal and precise enough so that one could, in fact, audit it like you do the other machines and use it as a tool for imposing better uniformity.

The description came too late to have an effect on the System/360 design, but it certainly helped us learn

how to describe machines, which introduced a lot of new ideas into the language.

So the relationship between the machine and the language is quite significant.

Yes indeed. I took it for granted that once one develops a language, you implement it.

That's not to say that when we came to implementing the language we

didn't find some surprises and some things we had to think through again. But that was because we came at the problem from a different point of view.

Instead of being constrained by the limitations of the computer, we were looking for what kind of notation we need for communicating clearly about complex and precise procedures. Not surprisingly, we came up with something that's very, very close to mathematical notation.

Is that why many consider APL a scientific or engineering language?

I think not. For example, mathematicians use the terms "vectors" and "matrices," primarily, I think, because they want to frighten people. A vector is just a list, and a matrix is just a table.

When we talked to people with business applications, they would say APL must be great for mathematicians, because you can use matrices

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A PROGRAMMING LANGUAGE

In Depth/6

IN DEPTH

and vectors. Then the mathematicians would say, "Gee, APL must be great for business people. Look at what you can do with the lists and tables!"

Another complaint is that APL uses too many symbols. Well, what's too many? Cobol purists insist that you write the word *plus* instead of using the plus sign. And why object to a lot of symbols in a language anyway? Take the matrix inverse symbol. It's complicated, but if you don't use ma-

trix inverse, why should you ever have to learn it? If you *do* use it, you'll have no problem understanding it. The objection is based, to a certain extent, on a misconception about how you teach language.

How so?

What you find is that most languages teach every primitive in the language, saying this means this and that means that. Suppose you taught

English like that! You'd drag out the 13-volume edition of the *Oxford English Dictionary* and say, "Look, here are the words in the language. Learn them, and after a while you'll begin to see what the language is for." That's the way most languages are taught, and APL is often taught in the same way.

What's the alternative?

For a given person with a certain

kind of background or discipline, introduce those symbols that will be meaningful to him. Give him a manual, which is equivalent to a dictionary, so that when he is conversing with others and finds there are other interesting words which might be relevant, even though he's never heard of them, he knows how to look them up. But the idea that you tell everybody the whole list of symbols in the language is ridiculous.

Is this how you teach APL in your classes?

Let me put it this way. I think the problem with any introductory course in a language, whether it's APL or anything else, is getting a clear notion of what your objective is. In the absence of an objective, you tend to introduce everything you can think of about the language. We've found that those who use APL successfully are people who already have a discipline of their own. The user might be an engineer, a financial analyst, a budgeting specialist, an accountant, an operations research person ... they are people who already know what they want to do. They have the vision to see that the computer could be a very effective tool for them.

Often, once they get an idea and go to discuss it with Computer Services, they become totally frustrated. They're told they must get a programmer and, due to the backlog, it will take two years to implement it. And yet they know the idea is conceptually pretty simple; why is it so difficult? If you teach them APL, they can begin to do it themselves.

They can do what themselves?

Essentially you want to teach them enough so that they can translate things expressed in their own discipline — whatever jargon or notation they use — and can then translate those things into APL and therefore into computer use.

So the user becomes the programmer.

Yes. They are programmers, but they dare not admit it because programmers are a step or two down in the pecking order. But you see, programming is writing down in advance what you want to do. The Greek root is *pro-gram* — *gram*: to write; *pro*: in advance. And that's what a program is. If the language is precise and executable, you've written a program. Anything that's worth doing can't be done in one fell swoop. Now in that sense, people are doing programming. We've got to get over the idea that programming is a second-rate activity.

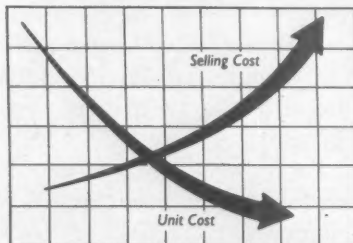
You mentioned business users in your example. How much is APL used in business data processing?

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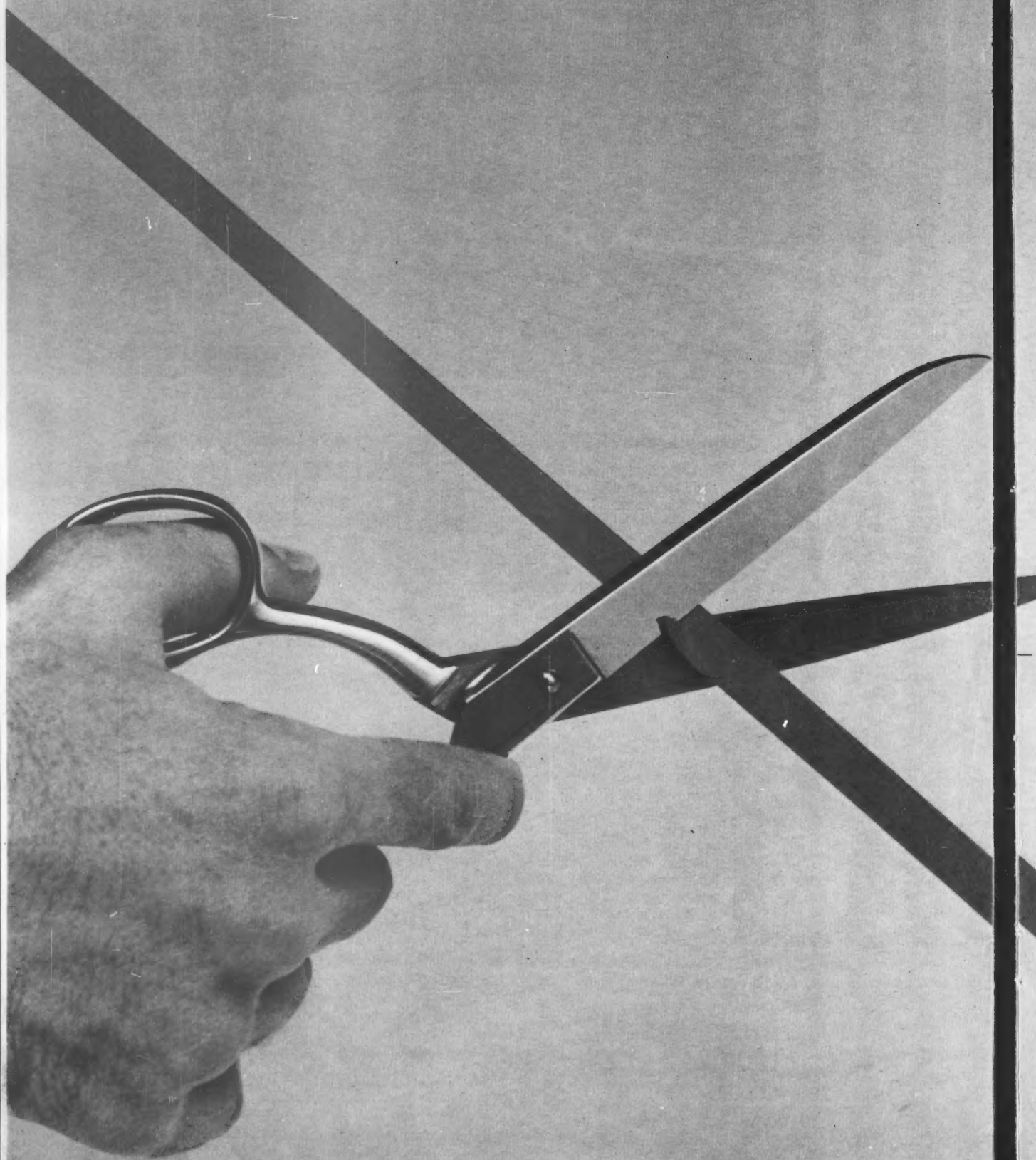
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IN DEPTH

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Your attitude toward APL seems to be to let the user take the credit for

implementing the language, without taking any personal glory for yourself.

Adin Falkoff once said, "You can accomplish an awful lot if you don't care who gets the credit." The best teachers are those who are just interested in ideas and in disseminating them, and if someone else picks them

up, that's just great.

Sounds like you might be describing yourself.

Well, more or less. But I can't deny that it gives me a warm feeling every time I see someone develop a new application.

The interviewer, Jack Rochester, is editor of Computerworld Extra.

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The **2076 Remote Cluster Controller** is a lightweight 30-pound package that accommodates up to eight printers and/or terminals in a bisynchronous environment. It measures a streamlined 6.5" high x 14" wide x 28" deep. While the 2076 can be located as far away as 4920 feet from its attachments, its dimensions allow for convenient placement just about anywhere, singly or stacked. Standard power-on, off-line and on-line diagnostics contribute to increased uptime.

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Sampling The Literature On APL

A number of books on APL have been published since Ken Iverson's *A Programming Language* appeared in 1962. Following is a representative sample of recent books that might be useful to the reader less familiar with APL and its uses.

- **A Source Book in APL** (1981) contains significant papers written by Kenneth Iverson and Adin Falkoff. The first article, "Formalism in Programming Languages," was written in 1964; the last, "The Inductive Method of Introducing APL," in 1980. Other topics covered in the remaining six chapters include the design of APL and the evolution of APL. The book is available for \$8.95 from APL Press, 220 California Ave., Palo Alto, Calif. 94306.

- **APL Micro Report** (1981) by Mokurai Cherlin takes a cookbook approach to APL via minicomputers and microcomputers. Cherlin points out that APL was first run on IBM mainframes, but since it is a user-oriented language, common sense shows its usefulness for personal workstations. Chapters include "APL for Building Systems," "Speed and Reliability" and "Finding a Compatible Terminal." The book also provides directories of systems software, CRT terminals and hard-copy printers. Published by The Southwater Corp., it may be ordered for \$26 from APL Market Place, P.O. Box 5314, Mt. Carmel, Conn. 06518.

- **APL in Practice: What You Need to Know to Install and Use Successful APL Systems and Major Applications** (1980) is a collection of articles prepared for the 1980 STSC Practical APL Conference and edited by Allen J. Rose and Barbara A. Schick. The 50-odd articles are divided into three sections: "The Data Processing Viewpoint," "The General Management Viewpoint" and "The Core of APL." Written by APL practitioners, the pieces present a diversity of views on considering, implementing or expanding the business applications of APL. Price is \$34.95 from John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10158.

- **APL: An Interactive Approach, Second Edition** (1976) is the standard textbook in APL. Written by Leonard Gilman (IBM) and Allen J. Rose (STSC), the text contains numerous examples drawn from IBM's APLSV and STSC's APL*PLUS. The book explains elementary operations, relational and logical functions, types of variables, character data, report formatting, branching, multidimensional arrays and generalized inner and outer products. It costs \$16.95 from John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10158.

A Language On the Rise

By Raymond C. Jordan

As a marketable computer programming language, APL appeared doomed from the start:

- It was not initially conceived as a language for computers, but as a language for mathematical notation.
- Its implementation on computers required special terminals and printers, generally not available in data processing installations.
- Its syntax, notably lacking in "user-friendly" English command words, consisted instead of a formidable set of Greek characters, each of which represented a potent operation that might be applied against a set of data of almost any size or shape.
- Its implementation initially made little provision for handling much of the standard record input-output found in the DP industry.
- It was an interpreted language, unable to be compiled or optimized

APL Market History				
Date Range	Market Highlights	Primary Application Areas	Estimated No. Companies in APL Market	APL in DP Installations
Late 1960s Early 1970s	IBM implementation on mainframes. Limited micro development — MCM Computers. Few peripherals — mostly IBM.	Engineering problem-solving. Actuarial/numerical.	10	Few have heard of APL.
Middle and Late 1970s	Many mainframe implementations. Major peripheral manufacturers offer APL as option. Minicomputer implementations begun.	Financial/marketing/sales. Systems with frequent changes. Complex systems. One-shot application.	40	Many have heard of APL. Few offer it.
Early 1980s	Emphasis on micro implementations. Most mainframes offer APL. APL comes standard on some micros and peripherals. APL not sold — what it does is sold.	General interactive systems. On-line production. Personal computing. General end-user reporting.	80	Many offer APL as time-sharing option to users.

Figure 1

in environments where processing time might be precious and expensive.

In Its Favor...

APL had only a couple of things going for it in its early days of the late 1960s and early 1970s: The language was fabulously productive in terms of programmer time, and it permitted the construction of swift, elegant code for applications at which other

languages balked.

These were powerful advantages. Nonetheless, marketing APL against orthodox languages proved a considerable chore. A mature, dispersed market for the language took a solid decade to develop (see Figure 1).

At first, those who used APL were primarily IBM people. IBM adopted the language early as a superproductive application development tool. More than 10,000 IBM employees

were estimated to have been using APL in some form or other within a few years of its inception.

Use of APL outside IBM seemed initially to focus on two main groups of users: engineers who saw the language as a problem-solving desktop megacalculator, and actuaries and numerical analysts who saw APL as a delightful tool for manipulating matrices like rate and liability tables.

During this early period, most of

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At these one day, regional conferences guests will have a close-up view of every type of computer and peripheral—mini/micros, disk drives, tape drives, printers, interfaces, controllers, graphic display terminals—and will be welcome to attend a program of technical seminars covering the latest state-of-the-art technology. Some of the companies associated with the series include Arsyscom BV, Century Data Systems, CII Honeywell-Bull, Cipher Data Products, Control Data, Data-ram, Genisco Computers, International Memories, MDB Systems, Priam, Printronix, Remex, National Semiconductor, Kennedy and Trilog.

Technical product seminars will be presented on streaming tape drives, graphic display systems, Winchester disks, matrix line printers, color printer/plotters and add-in memories. Plan to attend the conference in your area. Invitations are available from participating companies or from the ICC sponsor. For further information contact:

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Spring 1982
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London March 11, 1982
Stockholm March 18, 1982
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Invitational Computer Conferences

A PROGRAMMING LANGUAGE

In Depth/12

IN DEPTH

the marketing of APL was conducted by IBM and by time-sharing services running variants of IBM software on IBM computers. Virtually all significant APL use was on mainframes, with the notable exception of APL put on a microcomputer in 1971 by MCM Computers of Canada.

By the mid-70s, APL had begun to expand from strictly technical uses into the hands of a broadening base of high-level end users and some DP experts. New users — most from

large corporations — were finding APL handy for one-shot applications, complex systems, systems subject to frequent modification and applications in the financial, sales and marketing areas.

A set of marketing conditions combined during these years to broaden the user base for APL and usher in an expansionary stage:

- Machine costs were dropping, causing users to pay a smaller penalty for interpretive processing.

- Programmers were growing scarcer and more expensive, placing a premium on any language that increased the number of applications a single programmer could build and support.

- Most major peripheral manufacturers began to offer APL as an option on printer or terminal units.

- Major universities and business schools like Yale University, Harvard University and the Wharton School began to offer or require APL

or APL-like languages in degree programs.

- Turnover moved some of IBM's 10,000 APL users out of IBM and into responsible positions in other major companies. When their new DP departments grumbled things like "three years" or "never," these ex-IBMers would yell back, "APL!"

Mixed Record

Most mainframe manufacturers and time-sharing companies jumped to offer versions of APL during this expansion period, with a mixed record of success. Those that failed appeared generally to have misjudged the market by believing that APL would sell itself to users and would not necessitate a sales and support staff acquainted with the unique language.

These APL implementation efforts put the name of the language in front of a wide audience of computer

MEMO TO: CW Subscribers

RE: Your first issue of Computerworld OA is coming March 31, 1982.

FROM: Bob Ziegel, Vice President Special Publications

The office of the future we've dreamed about is here today. And now more than ever, staying abreast of changes in the rapidly expanding office automation field is important to the success of every organization. To guide you through the latest OA developments, we're announcing our newest publication, Computerworld OA. The first of four issues for 1982 is scheduled for March 31st.

Every Computerworld subscriber will receive a copy of these special issues as an extra bonus and more copies will be distributed at major shows in 1982. OA is edited by Ann Dooley and here are just some of the major topics you'll be reading about in our first issue:

- Find out who are the OA users and what OA applications are available to them.
- Read about the latest OA implementation strategies.
- Get a thorough overview of decision support systems.
- What are the management issues of integrating OA into the organization?
- Who are the major vendors and how do their products compare?
- Compare standalone WP vs. clustered WP functions—which is best for you.
- How has OA made the best use of personal computers?
- If you're moving up from WP—what's the next step?
- Find out how to set up an ergonomic office.
- An overview of local area networks.
- What's available in prepackaged software for the OA user?
- Get the latest information on voice mail systems.
- The lack of standardization and what users can do to compensate.
- Computer graphics—how to produce your own slides.
- In-depth evaluations of new OA products.
- Plus—a feasibility cost justification story.

The format of these four special Computerworld OA issues will be the familiar "tabazine" developed for CW Extra. Each issue will be tabloid size with magazine format for editorial content and advertising. Covers will be printed on glossy stock, and supercalendared, high-quality newsprint will be used on the inside.

Best regards,

Bob Ziegel

P.S. FOR ADVERTISERS: You can reach the people who are responsible for taking their companies into the office of the future with your ad in Computerworld OA.

Advertising close is February 19th and we'd be glad to give you more advertising information—as well as complete details on our subscribers and readers. Just contact your local Computerworld Sales Office, or, call Bob Ziegel, Vice President Special Publications, CW Communications/Inc. at (800) 343-6474.



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For the Latest On APL . . .

The Association for Computing Machinery (ACM) has an APL Special Interest Group (SigAPL) which boasts a membership of more than 1,500. SigAPL holds an annual congress; the next one will be in Heidelberg, Germany, July 26-30. SigAPL chairperson is Raymond P. Polivka, 60 Timberline Drive, Poughkeepsie, N.Y. 12603.

APL Quote Quad is a quarterly publication for SigAPL and is available free to members and at a small charge to others. The editor is Arthur L. Anger, Information Processing Services, MIT, 39-421, Cambridge, Mass. 02139.

APL Press has published 15 APL-related books and also publishes a free newsletter, "The APL News." The current issue may be obtained by writing APL Press, Suite 201, 220 California, Palo Alto, Calif. 94306.

I.P. Sharp Associates Ltd. hosts an APL users meeting every two years, with approximately 800 expected to attend the Toronto conclave Oct. 4-6. Sharp also publishes the "I.P. Sharp Newsletter" every two months, which focuses mostly on APL. It is free upon request. Any inquiries should be directed to Rosanne Wild, marketing services manager, I.P. Sharp Associates, 145 King St. W., Toronto, Ontario M5H 1J8 Canada.

STSC, Inc. has sponsored APL seminars and conferences and has several publications and books on APL topics as well. STSC's newsletter, "APL PLUS Service News," appears on a quarterly basis. It is free and may be obtained by writing Laurie Russell, editor, at STSC, Inc., 2115 E. Jefferson St., Rockville, Md. 20852.

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IN DEPTH

Examples of APL Use	
COMPANY	APPLICATION
R.T. French	Corporate consolidation
Burroughs Wellcome	Corporate consolidation
	Corporate planning
Computer Consoles	Lease accounting system
Niagara Mohawk Power	Rate schedules
Xerox Corp.	Statistical analysis and forecasting
	Parts tracking
Eastman Kodak Co.	Statistical analysis
Taylor Instruments	Warehouse inventory control system
Air California	Crew scheduling
Upjohn Co.	Production planning system
	Sales analysis reporting
Fireman's Fund American Life	Asset share
	Monthly budget tracking
	Group annuity reserves
	Economic analysis
The Planning Economics Group, Boston	

Figure 2

users. By 1980 most computer users had heard of APL, although only a relatively small percentage had ever tried it.

The current stage of APL appears to be characterized by efforts on the part of APL vendors to eliminate the constraints under which APL is marketed. The underlying goal is to

make APL a language for all people and all machines.

Forsaking the comfortable niche of typical APL application areas, vendors have recently taken the leap into mainstream computer applications with APL programs designed for such tasks as word processing, generalized reporting, personal com-

puting, manufacturing production systems and small business accounting.

One APL time-sharing company has begun promoting APL software for its function without indicating in advertising that the software is written in APL. The implication is that the days of selling APL only to APL aficionados may be numbered. In-

now runs on micros from Apple Computer, Inc., Radio Shack (TRS-80), Altos Computer Systems, Inc., Commodore Business Machines, Inc., Alpha Micro, Inc. and Wicat, Inc., the IBM 5100 series and the CP/M operating system. IBM is currently working on APL software for the Personal Computer. In a resounding acknowledgment of APL's acceptability as a

'The underlying goal is to make APL a language for all people and all machines.'

stead, APL will be an assumed part of a company's time-sharing arsenal, to be used or ignored depending upon the particular application and end user.

The race last decade to place APL on every mainframe has its parallel this decade with the race to give every micro an APL. Micro-based APL products have recently caught up to mainframe APL products in the number of advertisements placed in APL Market News, a user and trade publication.

Besides running on several models of MCM computers, APL software

general-purpose computing language, Commodore announced APL as a standard feature on its new Micro Main Frame microcomputer system.

Some APL users believe that if a person sits before an APL terminal long enough to give APL an honest try, the odds are good that that person will become an APL user. Because of the growing ease of access to the APL language, this notion can now be put to test against a large population of prospective APL users for the first time in history.

By eliminating problems of access to software and character sets, the market is giving APL a chance, at last, to shine or fail on its own merits.

Jordan is editor and publisher of "APL Market News," a quarterly newsletter published by the Southwater Corp., Mt. Carmel, Conn.

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Before you buy one more ANSI compatible video terminal, compare it to the "Small Wonder 10". You'll discover that only GTC can offer DEC VT-52/100 emulation at the best price/performance ratio available anywhere! Besides containing most of the VT-100 features, the SW10 provides as standard:

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The Language At Work

1. APL Corporate Model

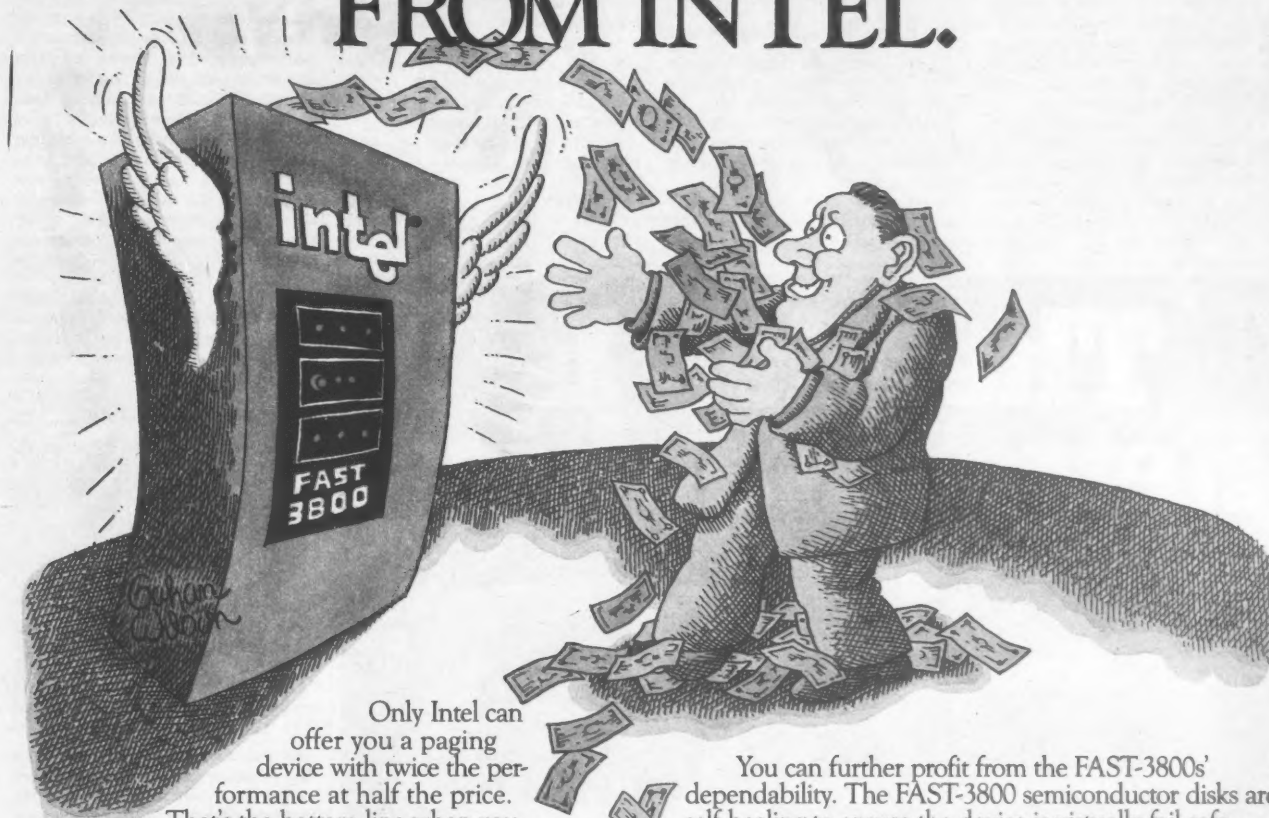
Southern Co. of Atlanta had always prepared a corporate budget or five-year forecast each year, but when the energy crisis hit in the 1970s, Southern decided a longer range corporate planning capability was necessary in order to cope with the new planning environment.

The electric utility corporation's new corporate model is a decentralized and completely prompted, totally interactive structure. No programming is necessary to examine a wide variety of strategic options.

APL was selected as the language because it is interactive, program development time is more rapid than with other languages and because it has an array manipulation capability that is superior to most other languages.

The model is divided into six sections or subsystems that simulate key utility planning areas: loan and energy forecasting, facilities for generation planning, production or operating costs, the revenue forecast, construction costs and financial projections.

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Unlike the 3880 model 11, Intel's FAST-3800s typically provide 100 percent coverage of page data sets. That means you get at least twice the performance. For less cash. Because the data sets are there—not out in another disk unit—when the CPU requests them.

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The heart of the FAST-3800s is Intel's iSBC™ 86/12 single-board computer. The microcomputer selected by many major DP manufacturers for use in their systems. It is this high-performance microcomputer which other paging devices lack, that uniquely enables the FAST-3800s to either emulate a 2305 or run in VM Native Mode.

Or to perform under DOS/VSE or MVT/VSE* operating systems.

Or function as a data base assist processor with Intel's SYSTEM 2000® data base management system.

And even emulate various direct access storage devices. This adds up to greater performance from a microprocessor-based design. Where software compatibility is no problem.

You can further profit from the FAST-3800s' dependability. The FAST-3800 semiconductor disks are self-healing to ensure the device is virtually fail-safe.

As a matter of fact, a Northeast U.S. hospital equipment manufacturer says, "The FAST-3800 has not been down for even one second since its installation on our 4341 in August, 1981." Dependability is a key part of our performance.

If a problem should arise, Intel product service offices are located in some 60 U.S., Canadian and European cities.

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*Developed by Software Partners, Inc.

IN DEPTH

APL is used for matrix manipulation, engineering simulation, standard accounting, data management, operating system interaction and file handling, algorithmic usage and conversational interaction.

According to Charles O. Manahan, who worked on developing the model, "All of these uses are fairly easy to program in APL. In fact, it is quicker to meet requirements with an APL program than to write a Cobol or Fortran routine to do the same

thing."

2. Acquisition Financial Model

Several years ago, when management of Continental Telephone Corp. of Atlanta realized that the telephone industry was going to be deregulated, it decided to address deregulation as an opportunity rather than as a threat.

A corporate development department was formed. Part of its charter was to formalize the planning process

and develop strategies to capitalize on opportunities in the telecommunications marketplace.

An APL acquisition financial model was developed to assist the department in determining the value of potential acquisitions and showing the acquisitions' contribution to Continental's growth. Through the use of the model, management can project an acquisition's future earnings and cash streams and compare these with past performance. The projections

can then be compared with corporate objectives.

The model was developed in approximately 12 weeks by an MBA candidate with the assistance of the director of financial planning, Don N. Hughes. The summer student, who did the majority of the coding, had no APL experience.

The model's modular design was easy to code and is easy to maintain, according to Hughes. This is important because models are continually modified as the user becomes more familiar with their capabilities.

One major reason APL lends itself well to financial analysis is that it is a matrix-oriented language that fits the characteristics of financial statements.

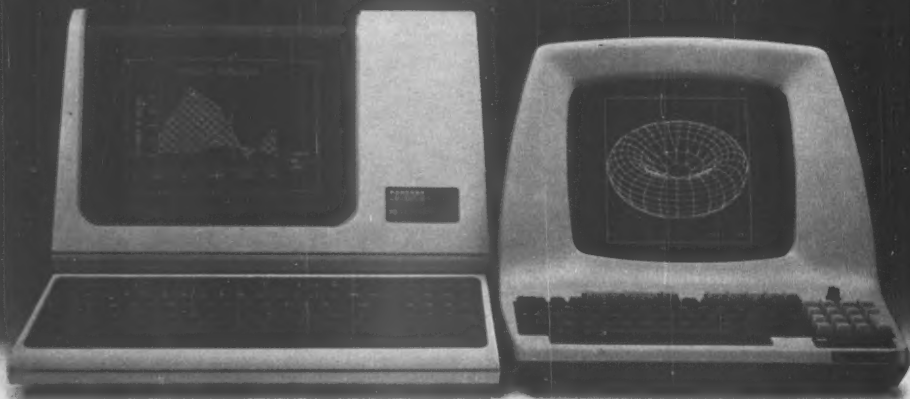
3. Financial Reporting

A major goal set by the corporate financial department of Sybron Corp. of Rochester, N.Y., in 1975 was to improve the corporate financial reporting mechanism. At that time, the corporation was comprised of 123 operating units, focused in 32 profit centers within five operating groups. As the company grew and diversified, corporate financial reporting requirements became a serious administrative burden. With the use of APL systems, the company's 32 profit centers were linked to the corporate headquarters (and each other).

APL systems are used extensively for collecting information and preparing and distributing reports for financial data for control, operations analysis and planning. A comprehensive personnel data base has allowed Sybron to prepare Equal Employment Opportunity reports, verify compliance with numerous government requirements and prepare and implement a participatory savings and thrift plan.

Access centrally and at the divisions allows shared responsibility for data base updates and maintenance, as well as shared access to report-preparation facilities. Virtually every area of corporate management benefits from these systems, particularly since intercompany memos are most frequently distributed on-line.

The Idea Is Retro-Graphics.



Retro-Graphics is quite literally changing the face of the display terminal marketplace. Because the line of graphic enhancement products that carries the Retro-Graphics name transforms some of today's most popular alphanumerics terminals—the DEC® VT100® terminal, for instance, and Lear Siegler's ADM-3A and 3A+ Dumb Terminal® products—into terminals that feature full graphics capabilities.

These enhanced terminals feature complete emulation of their Tektronix® counterparts, the 4010 Series graphics terminals. Additionally, they boast vector drawing and point plotting capabilities, selective erase, alphanumerics overlay, raster scan technology and, of course, complete compatibility with industry standard software, including Tektronix Plot 10® and ISSCO's® DISSPLA® and TELLAGRAF®. And Retro-Graphics delivers all of this while retaining the original alphanumerics features of the enhanced terminals.

Thousands of users who have put Retro-Graphics enhancements into action can attest not only to the performance benefits but, importantly, to the often dramatic cost savings over comparable terminals. Savings that have amounted to upwards of 50% and more. Together, high quality and low cost make Retro-Graphics one of the brightest ideas to come along in some time. The idea you can check out for yourself by calling your Digital Engineering distributor. Or contact us direct.

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Data Bits

Dynatech Device Routes Data Between X.25 Trunks

ALEXANDRIA, Va. — Dynatech Packet Technology, Inc. has announced Multi-Switch.25, a routing device that can forward data arriving from one X.25 trunk to any other X.25 trunk.

The unit is available in either eight- or four-trunk versions and conforms to all national and international standards including X.25 and X.121, the vendor said.

Used as a companion product to the firm's PAD (Multi-Plex.25), trunk lines from seven Multi-Plex.25 units can be routed onto one trunk, the vendor said.

A four-port system costs \$3,375. An eight-port system costs \$5,350, the vendor said from 6464-G General Green Way, Alexandria, Va. 22312.

80-Char. Keyboard Terminal Fits Portable, Remote Jobs

GRANDVIEW, Mo. — A single-line 80-char. keyboard terminal intended for portable and/or remote communications environments is available from Computerwise, Inc.

The Transterm 2 communicates in full-duplex RS-232 serial asynchronous ASCII with RS-442 and 20 mA current loop available as options. One of eight bit/sec rates from 110 bit/sec to 9,600 bit/sec can be switch-selected, the vendor said.

The 80-char. display is said to support the full 96-char. uppercase and lowercase ASCII set in a 5 by 7 dot matrix font with an underscore cursor.

The terminal costs \$595 from Computerwise, 4006 E. 137th Terrace, Grandview, Mo. 64030.

Communications Monitor Out, Provides Multilevel Testing

LARCHMONT, N.Y. — A device that reportedly provides continuous, nondestructive multilevel testing of telephone circuits, modems and associated front-end processors at hardware, flag, data set and protocol levels is available from Gemini Instruments.

The Autotest can monitor the integrity of a small electronic mail system or a complex DP network, according to the vendor. It is operable in either asynchronous or synchronous modes with speeds to 20K bit/sec.

The unit costs \$1,295 from Gemini, Box 205, Larchmont, N.Y. 10538.

Short-Haul Modem Introduced For Use in Local Networks

WOODBURY, N.Y. — Remark Datacom, Inc. has introduced a short-haul modem/line driver for use in local networks.

The Model 72 is said to allow operation up to 9,600 bit/sec, full-duplex, using two twisted pairs. Two Model 72s can communicate at a distance of two miles at 9,600 bit/sec or 10 miles at 1,200 bit/sec.

Designed for asynchronous operation, the Model 72 costs \$125. Quantity discounts are available, Remark said from 4 Sycamore Drive, Woodbury, N.Y. 11797.

Serial Interface Designed For TRS-80 Model III

FOLCROFT, Pa. — A plug-compatible serial interface for the Radio Shack TRS-80 Model III has been announced by VR Data Corp.

The VR-RS232C features a programmable transmission-rate generator from 50- to 19,200 bit/sec, and is said to be fully interrupt-driven and features reverse polarity protection. The unit costs \$75 from the vendor, 777 Henderson Blvd. N-6, Folcroft Industrial Park, Folcroft, Pa. 19032.

Tariff for 800 Service Adds Electronic Message Ability

By Phil Hirsch

CW Washington Bureau

WASHINGTON, D.C. — Expanded 800 Service, which adds electronic message service capabilities to AT&T's long-established Wats offering, will begin operation April 25 if the Federal Communications Commission (FCC) accepts a tariff recently filed by the telephone company. The service will allow calls dialed to a single 800 number to be routed automatically to destinations prespecified by the called party.

A possible user of the service would be, for example, an on-line DP service bureau with multiple computer centers, according to an AT&T spokesman. Each center could serve remote terminals within specified telephone area codes. All terminals would dial a single 800 number and then be switched to the proper center.

Alternatively, Expanded 800 Service could balance the traffic coming into a single computer center among multiple computer ports.

Lowens Wats Bills

The new service will save many Wats customers money by enabling them to use a single 800 number for intrastate as well as interstate calls, AT&T noted. Presently, two numbers are required.

Moreover, by permitting traffic to be shifted automatically from one area of the country to another, the new service will reduce the need for computers with nationwide operations to staff their regional offices before and/or after regular working hours, the spokesman pointed out.

While the ability to automatically switch incoming message traffic from one main-

frame computer to another is not new, until now computer users tied to the dial-up telephone network have had to provide this capability themselves, often at great expense. The Expanded 800 Service provides automatic, customized switching as part of a network-resident service.

Bell Game Plan

Expanded 800 Service is among the first in a long train of computer-based, network-resident, on-line information offerings Bell plans to introduce during the '80s. The result could be more universal and more versatile electronic message, facsimile, data base retrieval and teleconferencing services.

Expanded 800 Service, plus all of the follow-ons, will utilize the Stored Program Controlled (SPC) network Bell is now deploying throughout the nation.

The key SPC elements are computerized telephone switching centers (typically equipped with No. 4 or No. 1A electronic switching system); common channel interoffice signaling, a high-speed system for transmitting station addresses and other control information through the network; and on-line data base facilities — Bell calls them Network Control Points (NCP) — that store customizing information related to individual services.

In the case of Expanded 800 Service, the NCP stores the customer's routing instructions and causes the switching center to forward each incoming call accordingly.

AT&T's Advanced Communications Service (ACS), now awaiting a green light from the FCC, also will utilize the SPC

(Continued on Page 60)

'Notepad II' for VM Exchanges Hard Copy Over Phone Lines

SAN BRUNO, Calif. — Any IBM or IBM-compatible processor running in VM environments will soon be able to support a teleconferencing system that allows users to "converse" in real time by exchanging written messages over telephone lines.

Infomedia Corp., an "executive communications" firm here, has rewritten its Notepad II teleconferencing system's software to be transported to selected IBM mainframes, according to an Infomedia spokesman. The software, which will become available in its rewritten form on July 1, was originally developed to operate only with the Digital Equipment Corp. Decsystem-20.

By the third or fourth quarter, Infomedia also plans to have adapted the software to support processors from several other hardware vendors, including Hewlett-Packard Co. and Prime Computer, Inc.

Notepad II combines an electronic mail capability with a data communications facility that allows geographically dispersed users to exchange messages interactively through almost any 300- or 1,200 bit/sec ASCII terminal. Notepad II's target customers include business executives, administrators, engineers and other professionals with little or no formal computing background.

A user first enters the appropriate passwords and access codes at a terminal keyboard and then types a message, which can be as long or as short as necessary. The message moves through the Tymnet, Inc. network and enters a Decsystem-20

housed in Infomedia's corporate headquarters.

The transmission can be stored indefinitely until a recipient at the other end retrieves it, or it can be summoned immediately from its intended destination, where a recipient can view the information on a terminal screen and send a reply by repeating the same sequence of steps.

Notepad-supported teleconferences can last as long as necessary and can include up to 36 participants simultaneously, the spokesman said.

Access to Notepad II's services can be gained through one of two means. Customers can either pay a one-time subscription fee that entitles them to unlimited use of Infomedia's in-house Decsystem-20, or they can buy the teleconferencing system's software and create their own Notepad-like networks.

Notepad II boasts several text-processing capabilities and other features not originally available with Notepad I, Infomedia noted. On-line access to Infomedia's in-house Decsystem-20 is available for a one-time subscription fee of \$1,000. Thereafter, the only expense for subscribers is computer time and long-distance phone use, which together average about \$1/min.

For Decsystem-20 users, Notepad II's software can be bought for \$25,000 until April 1 and for \$50,000 afterward. For IBM or IBM-compatible mainframe users, rewritten versions of the same software cost \$80,000 from Infomedia at Suite 275, 801 Traeger Ave., San Bruno, Calif. 94066.

COMMUNICATIONS

Color Graphics Printers Offered

NORCROSS, Ga. — Printacolor Corp. has unveiled two color graphics printers and cut the price of another.

The GC8000 and HR8002 use the same ink-jet technology as their predecessor, the IS8001. All three will produce seven-color hard copy with

a resolution of 90 dot/in. and print 10.7-in. by 8-in. display on standard 14-in. width fanfold paper in approximately 2.5 min.

The GC8000 costs \$3,995, the HR8002, \$4,995 and the IS8001, \$4,495. Printacolor can be reached at P.O. Box 52, Norcross, Ga. 30071.

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*The All-In-One Display incorporates features of the IBM 3278-2, 3, 4 & 5.

Tandem Builds Terminal Stressing Ergonomic Factors

CUPERTINO, Calif. — Computers Inc. has introduced for its Nonstop processors the 6530 Multi-Page Display Terminal, reportedly designed with an eye on emerging ergonomic standards in Europe.

The terminal has a 15-in. diagonal screen. Up to eight pages of memory can be stored in block mode for high data throughput, or 300 lines in conversational mode for access to previous screen display.

Currently, the 6530 can accommodate seven languages including English, French and German with language changes supported in software. The terminal has already been tested in Europe, most notably West Germany, and volume shipments are expected to begin in the second quarter of this year.

Tandem Software Compatible

Intended to work with Tandem Computer, Inc. software and hardware products to increase data integrity and availability, the Model 6530 has been designed with built-in diagnostic functions.

The terminal memory and all data paths are parity-protected and the terminal automatically performs self-test functions when switched on to ensure reliable operation, the vendor

said.

The 6530 can operate in synchronous or asynchronous modes, in half- or full-duplex and supports both RS-232C and current loop interface. The terminals may be run point-to-point or multipoint, the company said.

X.25 Network

The terminal also supports conversational mode on an X.25 network and block mode X.25 support will be available later in 1982. The data communications interface is user-selectable through a menu.

A printer option will be available later in 1982 that will allow the terminal to be attached either to the 5508 or the recently announced 5520 matrix printers, according to Tandem.

The 6530, built at Tandem's new division in Austin, Texas, is the first peripheral designed and manufactured by the vendor. All Tandem peripherals were previously bought from outside suppliers and modified to run on the Nonstop processors.

The 6530 is priced at \$3,200 in single quantities, with discounts available for multiple purchases. Tandem is located at 19333 Vallico Pkwy., Cupertino, Calif. 95014.

Bell to Expand 800 Service

(Continued from Page 59)

network. Essentially, ACS is a packet-switched data communications service designed to compete with those now offered by GTE Telenet Communications Corp. and Tymnet, Inc.

With ACS, Bell is employing a "bifurcated" architecture in which the packetizing/depacketizing function is performed in one set of nodes while the remainder of the interfacing job — involving "transport" functions such as error and flow-control — are done in another set of nodes.

The main reason for this arrangement appears to be the FCC's Second Computer Inquiry Decision, which allows Bell operating companies and the Long Lines Division to provide "basic" communications services while requiring AT&T to supply "enhanced" services to the end user through separately owned facilities.

The proposed settlement of the government's antitrust suit against the phone company could lead to a change in this architecture.

A Connecting Link

However, if that does not happen, the SPC network will be the connecting link between the separate subsidiary's packetizing/depacketizing nodes and the Long Lines Division's basic packet transport network. Alternatively, if the company eventually integrates its bifurcated ACS nodes, the SPC network will connect them with the telephone switching centers through which the customer accesses ACS.

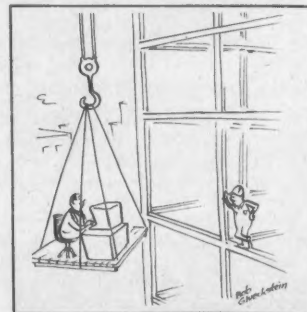
By 1984, the phone company has said, it plans to add switched digital capability (SDC) to its network. The basic goal is to provide all-digital

transmission, end-to-end, at speeds up to 56K bit/sec.

Among the likely applications of this new capability are high-speed facsimile, encrypted digital voice, teleconferencing, electronic mail and combined voice/data services, according to three Bell Laboratories officials connected with development of SDC, William O. Fleckenstein, S.W. Johnston and Barry Litofsky. They cited these applications at an international communications conference held last September in Montreal.

The most novel feature of SDC is a scheme for converting existing Bell local loops into digital transmission facilities on an alternate use basis. Use of a sophisticated echo-canceling technique called "time compression multiplexing" reportedly permits a pair of copper wire end links to transmit digitally encoded information two to five miles.

Currently, the switching center will set up an all-digital route through the SPC network to the desired destination.



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Burroughs Adds Modem Series

DETROIT — Burroughs Corp. has announced the CP 1000 Series of modems. The units operate at transmission speeds from 4,800- to 9,600 bit/sec and augment Burroughs current TA series of medium and lower speed modems.

Three of the modems feature microprocessor technology and a fourth model features large-scale integrated circuit design. Other features include the ability to multiplex usage of a transmission line into up to four channels and transmit data over multiplexed channels at varying speeds, the vendor said.

The modems cost between \$2,740 and \$6,800, the vendor said from its world-headquarters, Detroit, Mich. 48232.

ITT 2089 Modem Uses Voice Lines

NEW YORK — ITT has introduced the 2089 modem that reportedly receives and transmits data synchronously on voice-grade lines at 9,600-, 7,200- or 4,800 bit/sec. Said to employ automatic rate recognition, speed selection for the modem can be made manually on site as well as automatically at unattended locations.

The 2089 functions over two-wire public switched networks in half-duplex mode or in full-duplex using two dialed lines. In leased line operation, the modem functions in half-duplex via two-wire interconnect or in full-duplex when a four-wire circuit is used, according to a vendor spokesman.

All main functions in the modem are controlled by four microprocessors allowing the 2089 to be adapted to user requirements solely by software changes, a spokesman said. Comprehensive local and remote per-channel diagnostics including test loops and bit-error measurements are built-in features, the spokesman continued.

The modem is available for around \$5,000 from the Data Equipment and Systems Division, ITT, Suite 8927, One World Trade Center, New York, N.Y. 10048.

Rixon Unveils Timerless Unit

SILVER SPRING, Md. — Rixon, Inc. has announced a new model of its T212A Data Modem without a direct distance dial (DDD) timer.

The large-scale integration circuit T212A transmits and receives serial binary data full-duplex over the two-wire DDD network. Speed selections include up to 300 bit/sec asynchronous in the low-speed mode and 1,200 bit/sec synchronous or character asynchronous in the high-speed mode.

The cost of the T212A without DDD timer is \$895; with the DDD timer, it costs \$945. Rixon is located at 2120 Industrial Pkwy., Silver Spring, Md. 20904.

Comdisco Adds Net Backup To Recovery

ROSEMONT, Ill. — Comdisco Disaster Recovery Services, Inc. (CDRS) has introduced to its disaster recovery centers Comline II, a switched network backup capability for the teleprocessing community.

It was designed to meet the needs of the IBM-compatible community at large, a spokesman said.

In the event of a major CPU shutdown, Comline II is able to switch the host functions to the subscribed CDRS facility, where processing is reestablished, a CDRS spokesman explained.

Comline II's switching capability is processed through a fully Federal Communications Commission-registered network control center, using Bell system to accommodate all Bell and IBM-compatible modems. It will reportedly support all private-line connections from voice grade to high-speed dedicated lines, including multidrop.

The monthly subscription fee for CDRS is approximately \$1,500 for small- and medium-size systems and \$2,000 for larger systems. More information can be obtained from the vendor, 6400 Shafer Court, Rosemont, Ill. 60018.

IDS Releases Three Devices

LINCOLN, R.I. — International Data Science, Inc. (IDS) has unveiled a multiple modem-like back-up switch, a modem eliminator and a data test set printer.

The Model 8504-12 Multiple Modem-Line Back-Up Switch switches 12 analog four-wire channels, allowing four telephone lines to share a single modem for each channel or four modems to share a single telephone line for each channel. It costs \$1,735, the vendor said.

The Model 6100 Modem Eliminator was designed to allow for the interconnection of data terminal equipment without modems. It can be used in either synchronous or asynchronous modes and with terminals configured for half- or full-duplex operation, the vendor said. It costs \$710.

The Model 2910 Data Test Set Printer is a quiet, thermal printer head for a permanent, unattended record of data interface test results. The printer can be used on-line to obtain a record of failures of critical signals in the various data interfaces under test or off-line for a record of data errors and failure of interface signals, the vendor said.

It costs \$4,630 from IDS at 7 Wellington Road, Lincoln, R.I. 02865.

Correction

In the announcement of Selenar Corp.'s SG120R graphics board for Digital Equipment Corp.'s Decwriter [CW, Jan. 18], the unit's resolution should have been described as 110 dot/in. horizontally by 72 dot/in. vertically, the vendor said.

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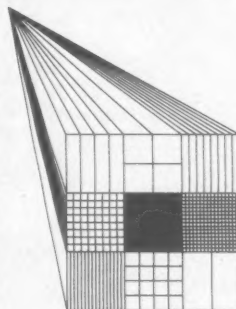
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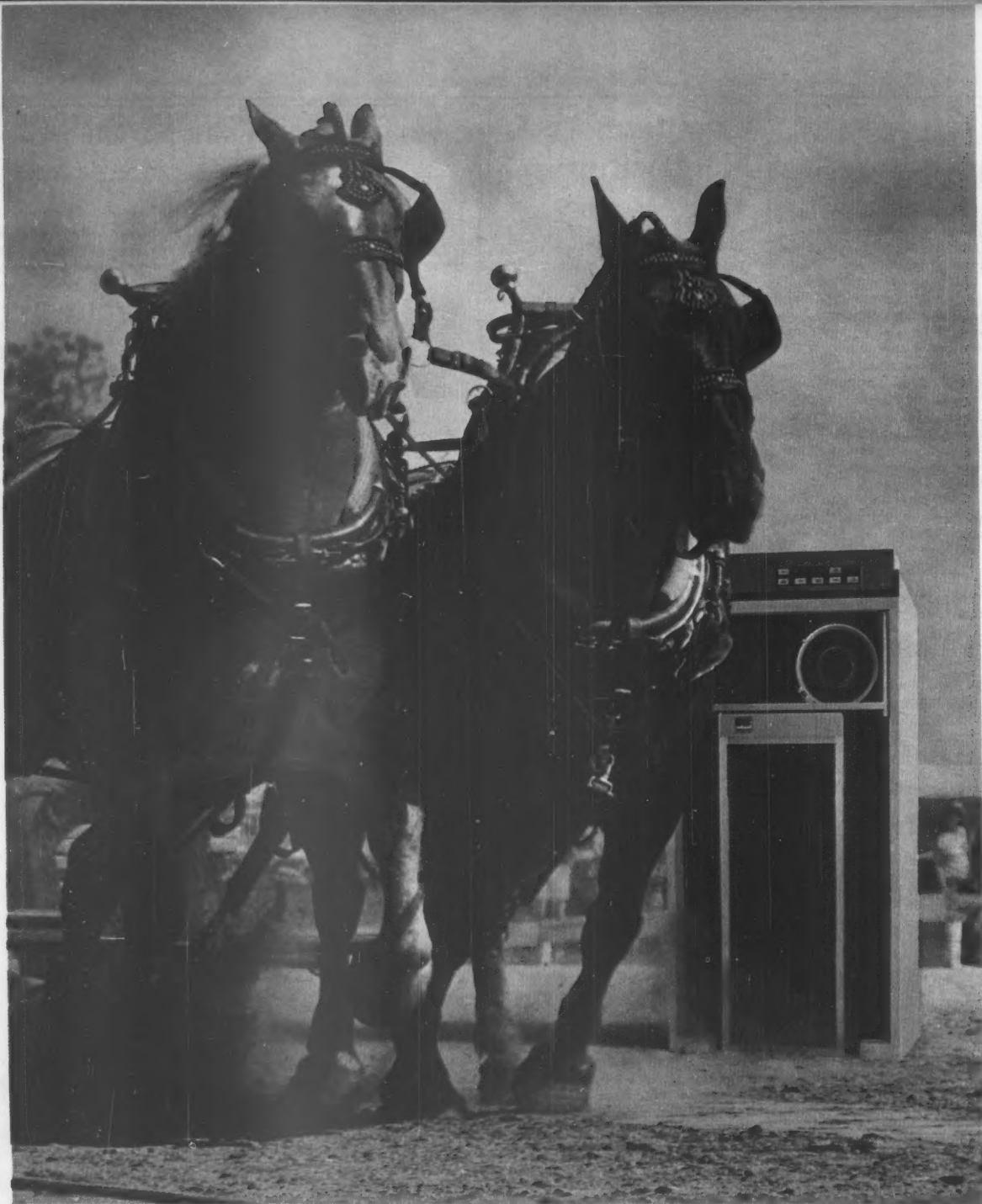
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Plug-Compatible System Packages

Nixdorf 8890 Series Challenges the 4331

WALTHAM, Mass. — Nixdorf Computer Corp. has unveiled a series of complete systems aimed at the U.S. IBM plug-compatible market that are said to compare in performance to the IBM 4331, but cost about 30% less.

The 8890 series consists of three computers — the Models 30, 50 and 70. The Models 30 and 50, which compare to the IBM 4331 Group 11 and the 4331 Group 2, respectively, were introduced about a year and a half ago in Europe [CW, Sept. 22, 1980]. The high-end Model 70, which competes with IBM's 4331 Group 10, was introduced in Europe last November.

However, this is the first time the systems are available in the U.S. market, a Nixdorf spokesman noted.

Nixdorf claimed the three 8890 series machines are the first completely plug-compatible system packages (hardware, software and peripherals) and the first to incorporate integral peripheral adapters. They were designed for use in centralized, decentralized or dedicated processing applications.

Instead of a single-processor architecture, all of the 8890 processors incorporate a central processing complex that contains a CPU with a 32-bit microprocessor for instruction processing and microprogram storage; a main memory processing unit; an I/O management and processing subsystem; and a service processing unit. Although all of the processor components function separately, they reportedly overlap activities for fast execution and higher throughput.

The Models 50 and 70 also include an instruction preprocessing unit that is aimed at improving system-wide performance in commercial applications.

The 8890 memory processing unit is a separate microprocessor that reconfigures memory in the event of a partial failure. The reconfiguration reportedly occurs on-line and permits continued operation while the problem is serviced.

The I/O processing and management subsystem consists of configurable groupings of system components, each constituting a complete I/O system, the spokesman claimed. Each grouping contains an I/O bus manager that connects dedicated I/O microprocessors to the CPU and to the memory processing unit.

Finally, the 8890's dedicated service processor provides for error detection, recovery,



The Nixdorf 8890 consists of three field-upgradable models for use in centralized, decentralized or dedicated processing applications.

ery, remote diagnostics and other support activities, the spokesman said.

All three systems rely heavily on internal microcode for their IBM compatibility. The microcode can be altered to allow for any updates or extensions to IBM program instruction sets.

To allow for the use of IBM-generated programs, the systems run under Nidos/VSE, an operating system developed by Nixdorf that is compatible with IBM DOS/VSE environments. The operating system has a maximum virtual address space of 16M bytes and supports 12 virtual and/or variable partitions. Nidos/VSE also supports three operating modes: virtual, real-dynamic and a combined virtual/real/dynamic, which allows users to tailor memory management to specific needs.

The firm's operating system also reportedly incorporates features and functions that are only available with IBM's OS/VS1 and MVS operating systems. However, for

IBM software purists, the 8890 processors — because of their inherent compatibility — can also use IBM operating systems.

The 8890/30 has a capacity of 2M bytes of main memory and can support up to eight Nixdorf 8330 or 8350 disk drives and up to four 8410 or 8420 tape subsystems. The 8330, 8350, 8410 and 8420 are performance equivalents to IBM's 3330 Model 11 and 3350 dual-density drives and 3410 and 3420 tape systems, respectively.

The Model 30 is also equipped with a byte multiplexer channel interface and a block multiplexer channel interface to attach non-Nixdorf peripherals. The system can support up to eight communications lines, the spokesman noted.

The Model 50 has a capacity of 4M bytes of memory and can support up to 16 disk drives and eight tape subsystems.

The Model 70 has a capacity for 8M bytes of main memory and can support 24 disk drives and 12 tape drives. Nixdorf's top-of-the-line model is also equipped with two byte multiplexer channel interfaces, but has three block channel interfaces.

The 8890 systems, including peripherals, range in price from \$90,000 for a basic Model 30 to \$800,000 for a high-end Model 70. Deliveries of the three systems are scheduled to begin early this year.

Nixdorf is located at 300 Third Ave., Waltham, Mass. 02154.

Summagraphics Adds CAD Tools

FAIRFIELD, Conn. — Summagraphics Corp. has announced a computer-aided design system called Summadraft.

Aimed at designers and draftsmen, the system can increase productivity over manual drafting procedures three to 10 times with as little as three hours training, the vendor claimed.

Three models are available: the 8000, 8100 and 8200. The 8000 is an entry-level unit suitable for small users. The 8100 offers higher performance and can be expanded with more memory and peripherals. The 8200 is a two-workstation system that permits independent operation and/or simultaneous sharing of drawings and other file information, the vendor said.

The systems are based on Data General Corp. Nova 4 processors. Systems cost from \$64,000, the vendor said from 35 Brentwood Ave., Box 781, Fairfield, Conn. 06430.

Kodak Introduces Microfilm Unit

ROCHESTER, N.Y. — Eastman Kodak Co. has introduced a high-speed rotary microfilmer, the Kodak Reliant 800. Its document transport system operates at a rate of 2,200 in./min, or 225 letter-size document/min.

The Reliant reportedly allows the operator to select from three formats — simplex, duplex and duo. It accepts a variety of Kodak 16mm microfilms either in 100-ft standard rolls or 215-ft thin-base rolls.

The microfilmer is controlled by a microprocessor. With a modular design it is possible to install accessories or other options such as an intelligent controller, an image maker, a sequential imprinter with key pad and a patch sensor.

It is available for \$11,000 from Department DP-2032, Business Systems Markets Division, Eastman Kodak, 343 State St., Rochester, N.Y. 14650.

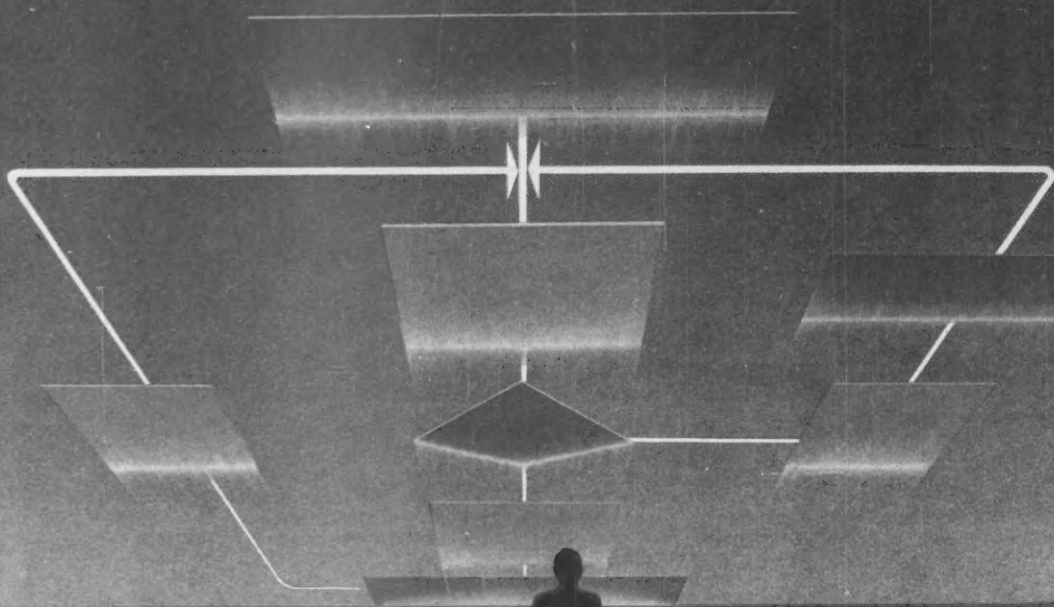
Datatend System Plans Maintenance

EGAN, Minn. — Datatend, Inc. has introduced a microprocessor-based preventive maintenance system for CPUs and other machinery.

Called Mainta-Gard, the unit can plan and schedule all maintenance (preventive and unexpected), establish maintenance priorities, provide a printout describing what work is to be done and when and keep a running record of completed maintenance jobs, the vendor said.

In addition, the unit can keep a machinery history including the date purchased, warranty data, maintenance costs, hours of downtime and so on. Systems start at approximately \$25,000, the vendor said from 3914 Beau D'Rue Drive, Egan, Minn. 55122.

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Desktop Microprocessor Compatible With CP/M

LOS ANGELES — Information Support Systems, Inc. has announced a line of Voyager desktop microprocessors.

The unit comes with 64K bytes of random-access memory, a word processing package and features compatibility with the CP/M operating system. A larger Voyager II is available with

2M bytes of memory and a dual floppy-disk subsystem.

The top-of-the-line Voyager III features 6M bytes of memory and a hard-disk subsystem, the vendor said.

Processors cost from \$9,995, the vendor said from Suite 205, 2049 Century Park, Los Angeles, Calif. 90067.

Centronics Printers, Datapoint CPUs Tied

HUDSON, N.H. — Centronics Data Computer Corp. has introduced an interface that allows its Model 6080 and 6081 line printers to operate with Datapoint Corp. processors. The interface has addressing capability and is supplied with a two-connector cable for easy chaining.

The Model 6080 provides off-line environment operation with a noise level of less than

60 dbA while the 6081 is a standard pedestal-mounted unit. These 600 line/min band printers also offer 48-, 64- and 96 char. bands in a variety of character sets, according to the vendor.

The price of the 6081 with the Datapoint plug-compatible interfaces is \$8,095; the price of the 6080 is \$9,500 from the vendor at 1 Wall St., Hudson, N.H. 03051.

Columbia Offers 8-In. Disk Drive Subsystems

COLUMBIA, Mo. — Columbia Microsystems, Inc. has announced the 1600 series of 8-in. disk drive subsystems.

Using Tandon Corp. Thinline 8-in. drives, the storage capacity for a two-drive unit is 2.4M bytes and 4.8M bytes for a four-drive unit. The drives are reportedly half the thickness of

standard drives, and two drives can be mounted in a single-drive cabinet, according to the vendor.

All models include power supply and cables. The two-drive unit costs \$1,695. The four-drive unit costs \$2,995, the vendor said from 905 E. Broadway, Columbia, Mo. 65201.

Floppy Disk Drives Fit IEEE Standards

ORANGE, Calif. — The Systems Group has announced single-sided and double-sided floppy disk drives designed for the IEEE 696/S-100 standards.

The drives, designed for CP/M-based or MM/P-based sys-

tems, feature error detection.

Units cost \$1,475 for a 630K-byte model, \$1,555 for a 1.2M-byte model; the controller for either model costs \$495. The vendor is at 1601 Orangewood Ave., Orange, Calif. 92668.

Apples Get Power Supply Upgrade Packages

SAN LUIS OBISPO, Calif. — A power supply upgrade package for the Apple Computer, Inc.'s Apple II and Apple II+ microcomputers — said to make them completely portable — has been developed by Cuesta Systems, Inc.

The Apple-Ups upgrade procedure, which takes a week, is said allow the micros to be used in mobile, remote or off-site industrial locations.

Apple-Ups costs \$195 from the vendor at 3440 Roberto Center, San Luis Obispo, Calif. 93401.

Datatech Brings Out Flexible Diskettes

DES PLAINES, Ill. — Wabash Datatech, Inc. has announced 8- and 5¼-in. flexible diskettes for small systems.

The vendor said the diskettes will survive more than 10-million passes without error. The diskettes are available in a variety of formats and densities and

are compatible with most office automation, personal computers, word processors and radio graphics systems.

The 8-in. diskettes cost between \$6 to \$8 each and the 5¼-in. diskettes cost \$4 to \$6 each, the vendor said from 2700 River Road, Des Plaines, Ill. 60018.

SSM Offers Apple II-Compatible I/O Interface

SAN JOSE, Calif. — SSM Microcomputer Products, Inc. has introduced an enhanced version of its AIO serial/parallel interface board for the Apple Computer, Inc. Apple II microcomputer — the AIO-II. It eliminates the need for other I/O boards by combining two boards into one, the vendor

said.

It can reportedly perform four independent interface functions including serial modem, serial terminal/printer and a general-purpose parallel port.

The AIO-II is available for \$225 from SSM Microcomputer Products, 2190 Paragon Drive, San Jose, Calif. 95131.

Micro-Sci Drive Available for Apple System

TUSTIN, Calif. — Micro-Sci, Inc. has introduced the A2 subsystem, a 5¼-in. drive for the Apple Computer, Inc. microcomputer.

The A2 with the controller is priced at \$579, \$479 without.

Micro-Sci is located at Suite 205, 17742 Irvine Blvd., Tustin, Calif. 92680.

Memorex Winchester Same Size, Mounting As Minifloppy Drives

SANTA CLARA, Calif. — Memorex Corp. has introduced two Winchester-type fixed disk drives that are identical in size and mounting to miniflexible disk units and offer up to 10M bytes of unformatted storage.

Although Memorex, now a Burroughs Corp. subsidiary, has manufactured small floppies in the past, this is the first time it has come out with rigid small disks that are standardized for the floppy market.

The Models 306 and 310 drives were developed in a joint engineering effort by Memorex Japan Ltd. and Nippon Peripherals Ltd., a subsidiary of both Fujitsu Ltd. and Hitachi Ltd. The two disk drives will initially be manufactured in Japan and later built at one or more of the Memorex plants here in Santa Clara; Westlake Village; Winnipeg, Manitoba; and Glenrothes, Scotland.

Each drive utilizes a sealed head-disk assembly, with all of the electronics contained on two printed circuit boards. Both drives offer an industry-standard interface, a spokesman said.

The Model 306 contains two

disks with four recording surfaces and read/write heads, while the 310 has three disks with six recording surfaces and heads. Each unit utilizes a band actuator and stepper motor to accurately position each of the heads on the correct media tracks, a spokesman noted. The motor is a brushless, direct-current device, shielded to protect data integrity.

The drives have an average access time of 170 msec, with an option available to reduce that time to 95 msec. The recording density of each drive is about 8,020 bit/in., the spokesman added.

The Models 306 and 310 can reportedly be user-installed in the same space taken up by a standard mini-floppy drive, without a provision for extra cooling. In addition, the drives can be mounted horizontally or vertically.

The drives will be available in the second quarter and will cost \$1,100 for the Model 306 and \$1,300 for the Model 310. Additional information can be obtained from Memorex at San Tomas and Central Expressway, Santa Clara, Calif. 95052.

Zilog Emulator Subsystem Supports Firm's Z8000 Line

CUPERTINO, Calif. — Zilog Corp. has announced an intelligent emulator subsystem that supports the firm's Z8000 line of microprocessors. The emulator allows Z8000 series processors to be networked for product development or distributed processing applications.

Called the EMS 8000, the unit offers real-time emulation support for all Z8000 processors including the Z8003 and Z8004 virtual memory processors. Features include complex triggering, a large partitionable trace memory and up to 126K bytes of mappable memory, the vendor said.

Up to eight microprocessors at speeds up to 6 MHz can be emulated simultaneously. The EMS 8000 can monitor message passing from source to destination, and a triggering capability enables the unit to trace message sending, the vendor said.

Network debugging is supported by a group-break feature that permits multiple EMS units to begin and end emulation simultaneously, the vendor said.

The EMS 8000 hardware consists of a central controller unit with 256K bytes of memory and 16K bytes of read-only memory. Also included is a two-board trigger module with three parallel trigger comparators that serve as building blocks. Trace

and timing functions, a real-time trace module with partitionable memory, an external probe interface module, a mappable memory module and a microprocessor personality module are also included, the vendor said.

The unit costs \$15,000, Zilog said from 10340 Bubb Road, Cupertino, Calif. 95014.

Sage Unveils Desktop Unit

MANHATTAN BEACH, Calif. — Sage Distribution, Inc. has announced a Z80-based desktop processor called Sundance.

The processor incorporates a 5¼-in. hard-disk drive, a single-board processor and a 10M-byte cartridge tape drive, the vendor said.

The unit is tied to a terminal with either an 80-char. screen or an optional 80/132-char. screen. Other features include a 4K-byte read-only memory, 64K bytes of random-access memory, support for 16-bit arithmetic, addressing modes and memory-to-memory block transfers, the vendor said.

The unit costs \$8,495 with an 80-col screen and \$8,995 with a 132-col screen, the vendor said from 1020 Pacific Ave., Manhattan Beach, Calif. 90266.

MINI-TWO LTD

Here's the Complete Computerweek Agenda! Use It to Select Sessions and Plan Your Schedule for March 2-5.

MONDAY, MARCH 1**7:30 - 9:30 p.m. — REGISTRATION****TUESDAY, MARCH 2****7:00 a.m. — REGISTRATION****7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION**

R-1 "Computing Power Politics and How To Control It" Chairman: Brad Schultz, Senior Editor, Mgmt. *Computerworld*; Speakers: Professor Rob Kling, Dept. of Info. & Computer Science, University of California, Irvine; Einar Steffereud, President, Network Management Assoc.

9:00 - 10:30 a.m.

A-1 "Managing EDP Resources for Greater Productivity" Key-note & Chairman: John Thompson, Vice President, Index Systems

A-2 "New Applications Opportunities in Telecommunications" Chairman: Professor Leonard Kleinrock, University of California at Los Angeles

A-3 "Vendor Markets - 1990" Chairman: Duane Kirkpatrick, Partner, Research, Robertson Coleman Stephens & Woodman; Speakers: Frank Kline, President, Pacific Technology Venture Fund; Robert F. Wickham, Vice President Marketing, Vector Graphics; Paula Lawrence, Manager, Marketing Research, Tymshare

11:00 a.m. - 12:30 p.m.

A-4 "EDP Productivity: Implications for the Manager, DP Practitioner and End User" Chairman: Werner Frank, Executive Vice President, Informatics. Speaker: Dan Merrill, Productivity Mgt. & Ed., Union Carbide

A-5 "Telecommunications Impact: Social, Organizational & Business Implications of Network World" Chairman: Dean Gillette, Executive Director of Corporate Studies, Bell Laboratories

A-6 "Communication Links: Word and Data Processing" Chairman: Alan Negrin, Director of New Product Planning, Harris Corporation, Digital Telephone Div.

12:30 - 2:00 p.m. — LUNCH

Featured Address: "Theory Z" — A Case History in Applying Japanese Management Techniques in an American Organization Speaker: John Rehfeld, Vice President & General Manager, Toshiba Information Systems; Bradford Spencer, Spencer Assoc.

2:00 - 3:30 p.m.

B-1 "Information Management Planning" Chairman: Clive Finkelstein, Information Methods (USA)

B-2 "Organization Modeling for MIS Departments" Barry Stevens, Vice President, Performance Management Associates

B-3 "IBM Software Strategies For The 1980's" Robert Cook, Vice President, VM Software

B-4 "Application Potential & Planning for Local Networks" Frank Dzubek, President, Communication Network Architects

B-5 "Future of System Network Architecture & Applications Environment" John King, President, K3 Group

B-6 "Future of PC/M" Chairman: L. Duane Kirkpatrick, Partner, Robertson Coleman Stephens & Woodman; Speakers: Charles Cornell, Director of Software Support, IPL Systems; Michael Backler, Director of Marketing, Nixdorf Computer, Molly Upton, EDP Industry Report

3:45 - 5:15 p.m.

C-1 "Reducing System Development" — Life Cycle Costs Gopal Kapur, President, Kapur & Associates

C-2 "Three Key Processes for Effective DP Management" Chairman: Edward L. Prichard, Director of Management Systems, Institute for Software Engineering

C-3 "Guaranteed Systems: Application Development Through Hardware Concepts" Dan Nolan, Deputy Director, Business Data Processing, Computer Sciences Corporation

C-4 "Ethernet & Base Band Approach vs Broadband & Coax Nets" Frank Dzubek, President, Communication Network Architects

C-5 "Using Non-IBM Terminals in SNA Environments" Saro J. Kar, President, Telecom Computer Technology

C-6 "Impact of Superminis on Business Systems" Chairman: David Anthony, Editor, *Computer System Reports*, Auerbach; Speaker: Edward Churchill, Western Regional Sales Manager, Perkin Elmer Corporation

WEDNESDAY, MARCH 3**7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION**

R-2 "Have Users Cut The IBM Apron Strings?" Chairperson: Marcia Blumenthal, Senior Editor, *Industry Computerworld*

9:00 - 10:30 a.m.

D-1 "Software: New Languages & The Application Development Process" Chairman: Martin Goetz, Vice President, Applied Data Research; Speaker: Karen Garnater, Manager, Information Resource Center, Lincoln National Life Insurance Company

D-2 "Operating Systems: Outlook for User Independence" Chairman: Asa Lanum, Vice President, Pansophic Systems; Speakers: Robert Marsh, President, Plexus Computer; Edward Churchill, Western Regional Sales Manager, Perkin Elmer Corporation; Jean Yates, Consultant, Gnostic Concepts

8:45 - 9:00 a.m.

Welcome To The OEM Business Forum: Pat McGovern, Chairman, International Data Group

D-3 "The Economic Outlook for The OEM ... Boom or Gloom?" Chairman: Sonny Monosson, Chairman, American Computer Group, Inc.; Speakers: David E. Raphael, Senior Economist; R. Joseph Stockhus, Management Systems Consultant, SRI International

11:00 a.m. - 12:30 p.m.

D-4 "Strategies & Implementation of The Corporate Data Base" Leo Cohen, President, Performance Development Associates

D-5 "Application Packages: An Architectural Assessment Methodology" Stuart Orr, Senior Partner, Orr Associates

D-6 "Japanese Vendors Meet The Press" Chairman: Peter Bochner, Los Angeles Bureau Chief, *Computer Business News*; Speakers: John Rehfeld, Vice President, Information Systems

Division, Toshiba; Kay Nishi, Microsoft; Robert J. Cowan, Vice President, Marketing, C. Itoh Electronics, Inc.

12:30 - 2:00 p.m. — LUNCHEON

Featured Address: "Venturing in the 1980: Outlook for New Computer Industry Companies" Speaker: Roy Rogers, Managing General Partner, Hambrecht & Quist

2:00 - 3:30 p.m.

E-1 "Large Processor Architecture Evolution" Chairman: Brian Jeffery, Director, Comp. Industry Research Strategic, Inc.

E-2 "Mainstream Choices in Database" Chairman: Charles Bachman, Vice President, Cullinane Data Base Systems

E-3 "On Line Program Development" Chairman: Jack Ewers, Manager Systems & Programming, Honeywell, Inc.

E-4 "The Vertical Marketing Survival Guide" Chairman: Lawrence D. Dietz, President, The Alec Group San Jose, CA; Speakers: Susan Croft, President, Susan Croft Associates; Dan Cotten, President, Parameter Driven Software

E-5 "Complex Legal Issues Affecting The OEM" Chairman: Richard Raysman, Attorney, Brown & Raysman; Speaker: Peter Vogel, Attorney, Peter S. Vogel P.C.

E-6 "Retail Takes On A New Meaning For The OEM" Chairman: Deborah de Peyster, East Coast Bureau Chief, *Computer Business News*; Speakers: Robert Wickham, Vice President, Marketing, Vector Graphics; Pam Inerra, Vice President, Future Computing; Joel H. Skolnick, Vice President of Finance and General Manager, Computer Store, Inc.

E-7 "Marketing Strategy Tools To Insure Continued High Profit" Speaker: Jack M. Keen, Director, Management Products, Input

3:45 - 5:15 p.m.

F-1 "Survivable Systems" Dr. William H. Highleyman, President, Sombers Associates

F-2 "Database Design for Distributed Systems" Hugh W. Ryan, Arthur Andersen & Company

F-3 "Measuring and Improving Programmer Productivity" Girish Parikh, President, Shetal Enterprises

F-4 "Software For The Vertical Marketplace" Chairman: Warren N. Sargent, Jr., Palo Alto Management Group; Speakers: to be announced

F-5 "Financial, Banks & Insurance Companies ... An OEM Opportunity" Speakers: Russell H. Dewey, Management Systems Consultant; Robert Jones, Insurance Industry Consultant; Martin Tucher, Director Commercial Banking Department, SRI International

F-6 "The Process Control Industry ... An OEM Opportunity" Speaker: Patricia Whiting-O'Keefe, Director of Advanced Computer Systems, SRI International

F-7 "Maintaining Your Margins Through Manufacturer Support" Chairman: Ron Mion, Senior Partner, Systems Marketing Associates; Speakers: John Mather, Vice President, Marketing, Point 4; Ron Omohundro, Director, Small Business Systems, THE TRW-FUJITSU COMPANY; John Osborne, Regional Sales Manager, Apple Computer; Mike Seashols, Vice President Marketing, Dynabyte

THURSDAY, MARCH 4**7:30 - 8:45 a.m. — EARLY BIRD RAP SESSION**

R-3 "Stop Throwing Work Stations At The User Productivity Problem" Chairman: Steven Schur, President, Mini Max Systems

9:00 - 10:30 a.m.

G-1 "Why Management Hates DP" Walt Lankau, Vice President, Management Decision Systems

G-2 "Personnel Crunch In Data Processing" Harold S. Bott, Partner, Arthur Andersen & Company

G-3 "OEM Technology: An Overview" Chairman: Vic Farmer, Editor, *Computer Business News*; Speakers: Andrew Roman, Consultant, Roman Associates International; Jean Yates, Mgr., Microprocessor/Microcomputer Industry Analyst, Gnostic Concepts; David Mandelkern, Research & Development Planner, Cromemco, Inc.

G-4 "Perspectives of Sales Taxation of Software — The California Experience" Chairman: Rory O'Connor, Senior Editor, *Software, Computer Business News*; Speakers: Stephen N. Hollman, Attorney at Law, Lakin-Spears; Donald B. Mulvey, President, Computer Services Associates; Susan H. Nycum, Attorney at Law, Gaston Snow & Ely Bartlett; Richard H. Ochsner, Tax Council, California State Board of Equalization

11:00 a.m. - 12:30 p.m.

G-5 "DP — Role In Office Automation: Issues and Solutions" Chairman: Walter Ulrich, President, Walter Ulrich Consulting; Speakers: Robert Evans, Director of MIS, El Paso Co.; Susan Wintersteen, Office System Specialist, Bechtel Power Company; Andrew Piebals, Manager of Personal Computing, Gulf Canada Ltd.

G-6 "The Programmer Gravy Train Derails" Chairman: Thomas J. Franc, Director of MIS, Bekins, Inc.; Speaker: Charlene Fencil, Consultant, Quality Assurance, Security Pacific National Bank

G-7 "OEM Survival Tools In The 80's" Chairman: Richard Cole, President, Computer Results, Inc.; Speaker: Michael Wood, Partner, CPA firm of Andreoli, Johanson and Wood

2:00 - 3:30 p.m.

H-1 "Planning & Selling Office Automation Projects" Robert S. Elliott, Arthur Andersen & Company

H-2 "Building Careers in DP" Janet Bensus, Janet Bensus Associates

H-3 "Concepts & Trends in Information & Data Resource Management" Dr. Steven H. Spewack, Vice President, Performance Dev. Corp.

H-4 "Software ... The State Of The Art" Chairman: Ann Winblad, Vice President, Marketing, Open Systems, Inc.; Speakers: Robert D. Brannon, Marketing Manager, OEM Microcomputer Systems Operations, Intel Corp.; Andy Johnson-Laird, President, Johnson-Laird, Inc.; Bob Smith, Vice President, Marketing, Forth

3:45 - 5:15 p.m.

H-5 "Push Button Code: Are Program Generators Just Tinkertoys?" Chairman: Chuck Butkus, The Software Factory; Speakers: William R. Stow III, Chief Executive Officer, Relational Systems International; Larry Downing, General Manager, D.J. AI Systems Ltd.

H-6 "The Fortune 500 Manufacturers ... An OEM Opportunity" Chairman: Neil Kleinman, General Manager, Pacific Technology Center, IDC; Speakers: Gerald G. Comisar, Manager, Electronic Systems Laboratory, Technical Research Center, TRW Electronics; Larry Kromling, Director, Product Marketing, General Automation

H-7 "A Guided Tour of Corporate Finance: How to Get the Most Out of Clients, Bankers, Suppliers, Venture Capitalist, & Public Offerings" Chairman: Raymond P. Haas, Attorney, Howard, Rice, Nemerovski, Canady and Pollak; Speakers: Bruce Brough, Hill & Knowlton, Inc.; Roger V. Smith, Imperial Bank; Marshall C. Turner, Jr., Taylor & Turner Assoc., Inc.; Peter Wallace, General Partner, Hambrecht & Quist; Ronald L. Walters, President, COMARC Design Systems

I-1 "Application Production Via Higher Level Languages" Jim Wilcox, Vice President, Hennco

I-2 "Cut Support Costs With Professional Documentation" Stephanie Rosenbaum, President, Tec-Ed

I-3 "The Local Network Avalanche" Chairman: Dr. Harry Saal, President, Nestar; Speakers: Larry Hartge, Vice President, Marketing, 3Com Corp.; Charles C. Bass, Vice President, Ungermann-Bass, Inc.; Mark Stieglitz, Manager, Local Networks, Western Digital; James C. Cogan, Vice President, General Manager, Small Business Computer Division, Datapoint Corp.

I-4 "The Independent Software Business Vendor" Chairman: Rory O'Connor, Senior Editor, *Software, Computer Business News*; Speakers: John Katsaros, Director of Marketing, Digital Research; Judy Ross, Marketing Manager, Intel Corp.; John Smallcomb, Market Segment Manager, Business Applications Systems, Data General

I-5 "The OEM Market Analyst ... A Look To The Future" Chairman: Tom Casalegno, Vice President/Publisher, *Computer Business News*; Speakers: Neil Kleinman, General Manager, Pacific Technology Center, Inc.; Lawrence W. Roberts, General Partner, Hambrecht & Quist; James N. Porter, President, DISK/TREND, Inc.

I-6 "The European Market ... How To Break In Successfully" Chairman: Christopher G. Codrington, Managing Director, Interco Business Consultants Ltd.; Speakers: Sergio Ferragut, Cullinane Corporation; H. E. James Finke, President, Commodore International

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'A Question of Business' Steps Outlined to Forestall Office Unions

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — "You are in the middle of something that is of the same magnitude as the industrial revolution. It's really not a question of good guys and bad guys, it's a question of business."

John G. Kilgour was referring to the future of office automation and unionization when he made that pronouncement here recently.

Speaking at a session of the International Information/Word Processing Association's 1982 spring symposium, the associate dean of the California State University at Fullerton School of Business and Economics emphasized preventive measures that information managers may take to forestall union organizing. Only 6.5% of white-collar clerical employees in the U.S. private sector are unionized and if he were a union organizer, Kilgour said, he would be very attracted to word processing employees.

'Social Office'

One reason clerical workers have remained nonunionized while manufacturing and transportation workers have organized is the "social office." In the social office, the boss and his secretary are friends and it would be a form of treason for the secretary to unionize, he explained.

Labor law is an area to understand if unions are to be thwarted, the associate dean said. The first legal question to ask is what law is applicable to a group of workers. In most private-sector cases, it is the National Labor Relations Act, which has served as the well-spring for other similar laws.

The centerpiece of the National Labor Relations Act is Section 7 of "employee rights." Employees have the right to join unions and engage in "other concerted activities for mutual aid and protection," according to the section.

Section 8 describes unfair labor practices for employers. Kilgour pointed out that under the section, a supervisor or other manager is regarded as the employer. He suggested staying on the legal side of the law by remembering the acronym "Tips," or do not threaten, interrogate, make promises to or spy on organizing workers.

Union organization usually starts when a group of dissatisfied employees make contact with a union organizer. From there, the process can move startlingly quick, especially in the case of small companies where the decision to unionize can be made over lunch and a petition for union elections filed later the same day with the National Labor Relations Board (NLRB).

Unix More Standardized Than CP/M, Runs With More Packages: Wharton Professor

By Bruce Hoard
CW Staff

ANAHEIM, Calif. — The Unix operating system is more standardized than Digital Research, Inc.'s CP/M. Much of the software written under CP/M has to be converted to run on disparate processors, according to Dr. Howard Morgan.

Speaking at the International Information/Word Processing Association 1982 Spring Symposium here recently, the professor of decision sciences and information sciences at the University of Pennsylvania's Wharton School covered a range of office automation-related software topics.

As Morgan explained it, CP/M was developed to "look like" the operating system of Digital Equipment Corp.'s PDP-11 minicomputer. At the same time, it was designed to be machine-independent — able to run on machines from different vendors. The operating system is now widely used on microcomputers, and a host of software developers have written approximately 2,000 packages specifically to run under it.

"How many of those can I use?" Morgan asked rhetorically. "Four," he answered, in-

dicating that the packages, many of which are written by small software garages have to be converted.

Unix More Portable

Unix, on the other hand, is more standardized, or more portable, because it is written in the high-level language C, Morgan maintained. Developed by Bell Laboratories, it runs on a spectrum of computers from AMDahl Corp. machines to 16-bit microcomputers.

Unix allows moderately skilled users to create new personalities for the system through the use of "shells" which can make Unix appear as CP/M, IBM or even a menu-driven office automation system. There are many existing utilities and software for the system. Although it consumes an inordinate amount of processing power, the expanded memory chips in use today negate that disadvantage.

Morgan, who also works as a consultant with Advanced Office Concepts, said office automation software is currently in its fourth generation. It has evolved from electric typewriters and almost no user programming to

(Continued on Page 68)

Before workers can petition for union recognition, they must show that at least 30% of the employees have shown an interest in doing so. This is accomplished by the signing of authorization cards by those in favor of the union.

However, workers do not have to go to the NLRB, Kilgour said. If they choose, they can present their union intentions to a supervisor or manager. "What would you do if that happened?" he asked the audience.

The first thing to do is say you do not want to see the authorization cards, which allows the employer to maintain "good faith doubt." If the employer even counts the cards, an election may not be needed to certify the union, he warned.

The bargaining unit is critical to unionization, which the associate dean said is "usually a

rational response" to a labor situation. The bargaining unit is the number of employees who are allowed to vote for or against unionization.

Communities of Interest

Looking at potential unionization from a word processing point of view, Kilgour said that companies may make it harder for bargaining units to form if word processing employees are not linked by "communities of interest" such as a common supervisor, common work location, comparable wages and benefits or integration of the word process.

He advised employers to start early if they suspect creeping unionism.

Drawing an analogy, he said waiting too long to thwart a union is like using a fire department for fire prevention. "When the fire department

leaves, the rug's all wet and they chopped through the door," he commented.

Once the "critical period" begins, the employer is legally bound to maintain the status quo regarding wages and working conditions, which means that its best opportunity to prevent unionization has passed.

Kilgour also had a rather prosaic piece of advice: "Be a good employer." Elaborating, he stressed the importance of providing a fair wage, reasonable benefits and generally following the golden rule.

If an employer, especially an employer with a word processing staff, is not good, he can look forward to a gloomy time with a union commenting on the ins and outs of word processing, he declared. "If I was an information manager, the last thing I would want is to negotiate these things."

A.B. Dick Entry-Level WP System Upgrades to Larger WP Network

CHICAGO — A.B. Dick Co. has introduced an entry-level word processing system that can be upgraded to a larger word processing network.

Called the Magna-Writer, the system consists of a workstation, keyboard, CRT terminal and a 5¼-in. single disk drive.

Through an accessory switch-box hookup the Magna-Writer can be activated for either printer or communications modes or two-workstation/one-printer operation.

The system includes standard

Magna III software packages including the RS-232 Communications Port, Calculator Math, List Processing and Type-through Mode. The CP/M Release 2.2 and Microsoft Basic operating system are optional.

The system is priced at \$4,995 and will be available in mid-March. An upgrade of the system, an optional 5¼-in. dual disk drive is available for \$1,000.

In addition, the Magna-Writer can become a shred resource word processor with a "loop"

board kit, offered at a suggested retail price of \$1,300. This option allows the Magna-Writer to be interfaced with the firm's Magna III word processing system.

Another option announced with the Magna-Writer was a printer capable of printing fully formed characters at a minimum speed of 20 char./sec, using a new 98-char. plastic printwheel. The printer is priced at \$1,995. The vendor is located at 5700 W. Touhy Ave., Chicago, Ill. 60648.

Terminal Sale

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DEC LA-34 DA	\$ 795.	\$ 47.
DEC LA-34 AA	845.	50.
DEC LA-120 AA	2245.	133.
DEC VT-100	1490.	88.
DEC DF03 KA	830.	43.
DEC DF03 AC	1075.	53.
AJ 242 COUPLER	175.	10.
HAZELTINE ESPRIT	625.	37.
ADDS VIEWPOINT	625.	37.
VISUAL 200	950.	56.
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VISUAL 400	1325.	78.
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Unix More Standardized Than CP/M: Professor

(Continued from Page 67)

an environment where major vendors provide full operating systems and full user programming designed to take advantage of personal computers and the burgeoning software market they have engendered.

His research led him to target professional productivity, multifunctionality and user friendliness as the keys to future office automation. He broke them down into their key components and worked on optimizing each of them.

As far as professional and managerial productivity were concerned, Morgan determined there was excessive daily communication; in order

to remedy that, he prescribed software designed for electronic mail and messaging and electronic conferencing. The former would be to eliminate telephone tag and the latter to slash travel costs.

He offered advice in both areas, saying the greeting portion of a telephone answering service should be limited to seven or eight seconds and electronic conferees should have already physically met each other.

As part of the effort to achieve multifunctionality, Morgan endorsed software for records processing, which has been available for many years, and data base management, a much more recent concept. He defined data base management as the ability to manage complex information by cross-linking it. However, he noted that the introduction of that advanced capability creates a need for some retraining.

High-Level Languages

The user friendliness that Morgan sought may be gained through the use of high-level, nonprocedural languages that will allow users to write their own programs without dealing with the procedural, point-by-point programming of older languages such as Fortran, which has not been developed significantly since its birth in 1956.

In a similar vein, he urged users to buy rather than write their own software because when it comes to writing software, human beings are not very good at it. For instance programmers wrote 12 lines of debugged coding per day in 1955 and the same rate holds today, he claimed. Instead of office automation, we have office mechanization, the professor declared. Office mechanization uses tools to perform specific tasks if documentation is done through word processing and calculation through DP. When there is true automation, all tasks will be interrelated as part of a load, he observed.

He also said automation is more palatable to office workers psychologically than is mechanization. As parts of mechanization, workers feel like preprogrammed cogs, but under automation, they have the satisfaction of initiating a process that is more meaningful to them, he said.



Attn: 3270 Users

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Lexitron Users Of WP Gain Financial Mode

STERLING, Va. — Berman Associates, Inc. has announced Data-View, a financial modeling package designed for Lexitron Corp. word processors.

The package is an electronic spreadsheet program and has features similar to calculator programs available on personal computers, the vendor said.

The package costs \$795 and comes with the program (on diskette), a users' manual and a plastic keyboard overlay. The package runs on Lexitron's VT-1202 word processor, the vendor said from Suite 14, 101 E. Holly Ave., Sterling, Va. 22170.

TFC Model 8500 Gets WP Package

LOS ANGELES — A word processing software package for the TRW-Fujitsu Co. (TFC) Model 8500 small business computer system has been announced by TFC.

Designed for first-time users, Datascribe functions on multiple workstations used simultaneously and has security features, the vendor said.

Information reportedly can be processed interactively or in a background mode while other work is in progress, a spokesman added.

Datascribe costs \$3,500 from TFC, No. 620, 9841 Airport Blvd., Los Angeles, Calif. 90045.

Compuscan Interfaces Alphaword III to Aquarius

TETERBORO, N.J. — An interface available from Compuscan, Inc. now connects the Alphaword III optical character recognition Pagereader to the Aquarius word processor from Syntrex, Inc.

The Alphaword III reads text at a rate of up to 270 pages per hour with an accuracy rate of less than one character substitution per 300,000 scanned characters, the vendor said.

When scanning is performed in an unattended mode, unrecognized characters appear as question marks, and "best guess" characters are preceded by a question mark. These characters can then be located by use of the search feature on the Syntrex

word processor.

The new interface is priced at \$2,000 and is immediately available from Compuscan at 900 Huyler St., Teterboro, N.J. 07608.

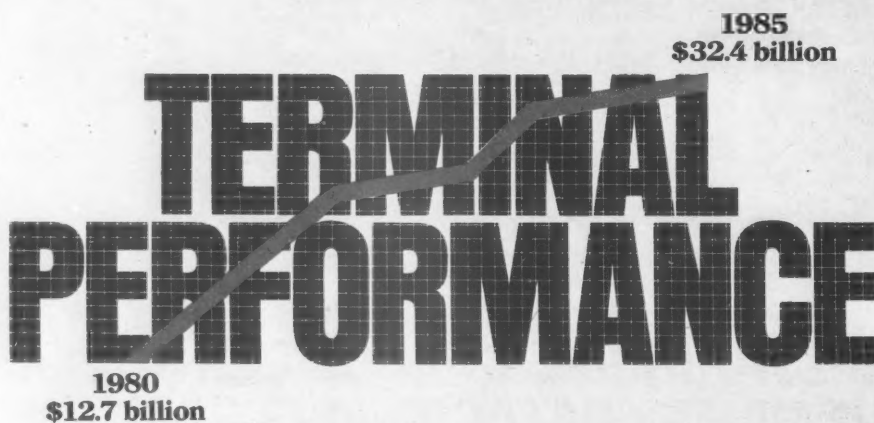
Manual, Diskette Offered for Wang

WEST ACTON, Mass. — A self-paced training manual and diskette for glossary decision processing applications of Wang Laboratories, Inc.'s word processing and office information systems is available from Verbatim Training here.

The manual covers the basic features from creating, editing and recalling a glossary to forms fill-in and IF statement building, the vendor said.

The package consists of a manual and a diskette and is priced at \$300.

Verbatim Training is located at 438 Hill Road, P.O. Box 569, West Acton, Mass. 01720.



Computerworld's March 29th Special Report configures out "Data Communications Terminals" for you.

The terminal market is anything but terminal. In fact, the market is exploding as more intelligence is being built into terminals, giving end-users a wider range of functions and greater flexibility of applications. To illustrate this growth, International Data Corporation, the world's leading information industry market research firm, projects that the installed value of data communications terminals will jump from \$12.7 billion in 1980 to \$32.4 billion in 1985.

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Honeywell Relocates Software Development

By Jeffry Beeler
CW West Coast Bureau

PHOENIX — Honeywell, Inc. has begun transferring its software development organization from the makeshift facilities it has occupied for two years to a new \$9.5 million building adjoining the company's Large Information Systems Division (LISD) headquarters.

Some 100 of the vendor's programming professionals have already situated themselves in the Software Development Technology Center, which formally opened its doors on Jan. 29, and another 600 or so of their colleagues are expected to follow in March or April.

When fully occupied, the center will house approximately 750 technical specialists and administrative-support personnel. (Continued on Page 74)



Honeywell's Software Development Center

CW Photo by J. Beeler

AEA on Bill: 'Do Us a Favor . . . Don't'

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — In a change of pace from most special interest lobbying activities here, a group representing hundreds of small electronics firms went to Capitol Hill recently to urge defeat of legislation that would benefit its constituents.

In a "do-us-a-favor-and-don't-do-us-any-more-favors" statement, The American Electronics Association (AEA) said a bill to require federal agencies to set aside a portion of their research and development outlays for small firms would do more harm than good.

By adding an additional layer of bureaucracy to the already cumbersome federal procurement process, the bill would only perpetrate the problems of government contractors, the association said. Small firms would be better served by streamlined procurements and additional R&D tax credits for startup companies, according to AEA representative Randy Knapp, chairman of Wespercorp.

"The proponents of this bill are trying to help young high-technology companies. They

are trying to help us. We sincerely appreciate that," Knapp told the House Science and Technology Committee, "but please don't do it."

Knapp's testimony came during several days of hearings on the Small Business Innovation Development Act. The bill and its Senate counterpart would require major federal departments and agencies to set aside up to 3% of their R&D budgets

for small high-technology companies [CW, Aug. 24].

The legislation passed the Senate in December and the House bill has strong bipartisan support. The bills recognize that small firms account for a disproportionately large share of U.S. innovation, but receive only a small part — 4%, according to the AEA — of federal R&D funds.

The legislation, however, of-

fers "the wrong solution to the wrong problem," according to the association, which said more than 80% of its members would qualify for the proposed set-aside program. Knapp told the House committee "the real problem, in AEA's view, is not the antismall business bias of civil servants, but the unbelievable complexity of the federal procurement process itself."

(Continued on Page 74)

Sees Benefit to Public

Fed Brief Supports Citicorp Services

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal Reserve Board attorneys said recently that Citicorp's data processing subsidiary should not be restricted in its plan to expand DP services, a proposal being contested by the Association for Data Processing Services Organizations, (Adapso) Inc.

"No significant adverse effects are likely to result from the proposal," the Fed staff said in a recent brief filed as part of a regulatory proceeding before the board on the plans of the

bank holding company's Citishare subsidiary. Explaining the staff views at the final oral argument in the proceeding earlier this month, Fed counsel Carl Howard said the staff believes the proposal will benefit the public by increasing competition and would not lead to unfair marketing practices by Citishare.

Citicorp has asked the Fed to clarify its rule restricting banks to services "closely related" to traditional banking activities. The bank holding company said it needs to take advantage of the latest DP technology to

compete with emerging, sophisticated financial services organizations such as Shearson-American Express and Sears, Roebuck & Co. [CW, Oct. 5].

Adapso, however, argued that Citishare offerings could be unfairly underpriced through cross-subsidies from Citibank revenues. The association also said Citicorp subsidiaries might tie various financial and data processing services, forcing customers to leave independent DP services' providers in order to qualify for favorable treatment from Citibank.

(Continued on Page 78)

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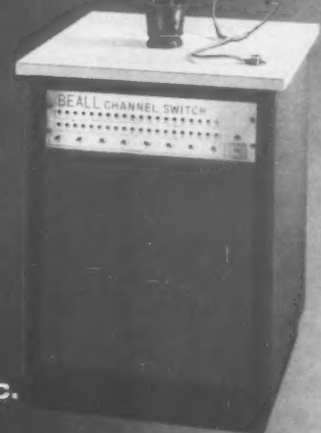
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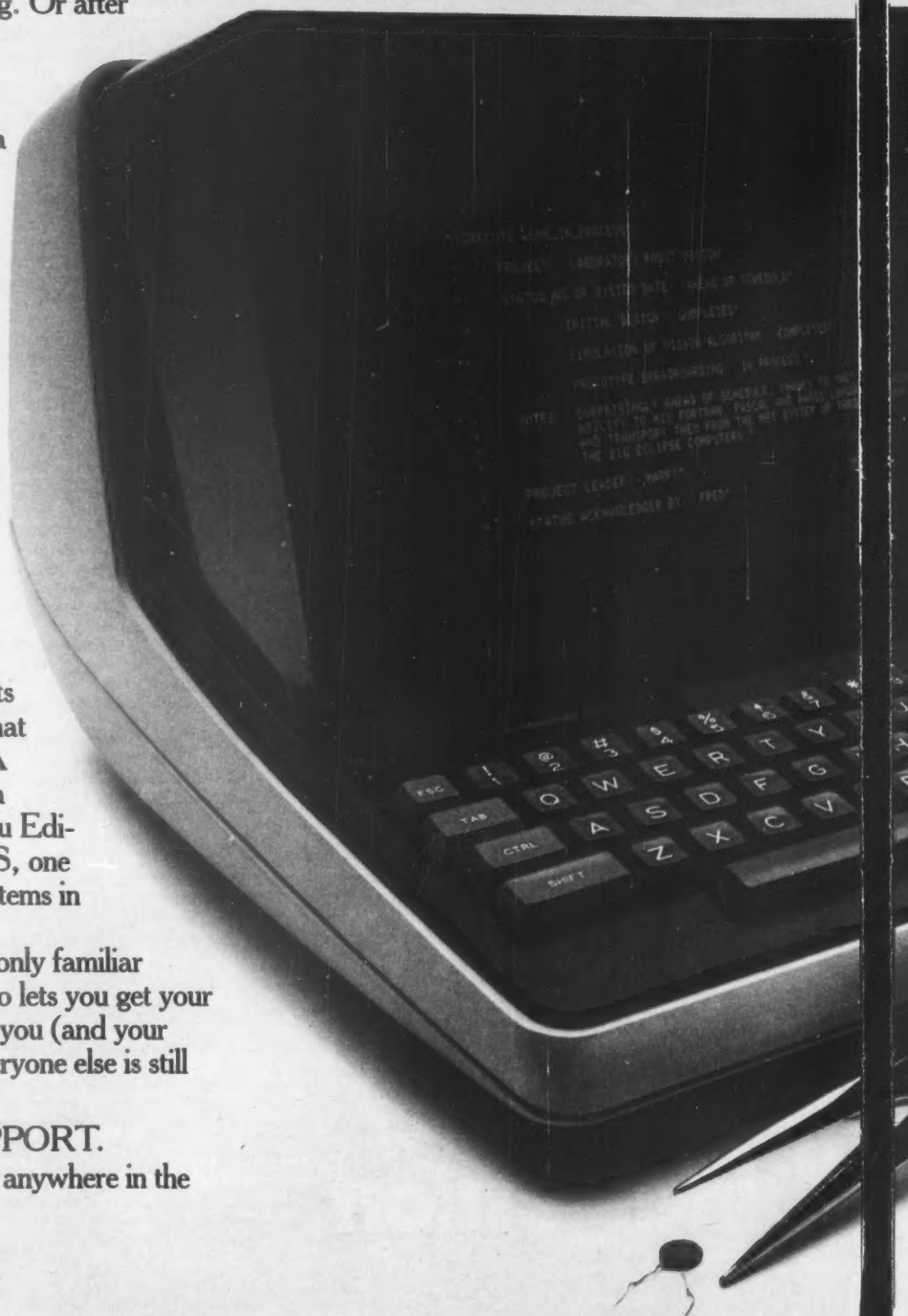
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Honeywell Moves Software Development Site

(Continued from Page 71)

nel, including software architects, systems analysts, programmers, program testers and clerical workers. Together, the employees will spearhead the development of systems software for Honeywell's large-scale main-frame line.

Also for Multics, CP-6

Although most of the center's development resources will be devoted to the firm's Ccos operating system, the facility will also contribute to the production of Multics and CP-6, Honeywell's two other high-end systems software products. On the Multics and CP-6 fronts, the center will restrict its efforts primarily to the development of program elements like languages and data base management systems.

The intent behind the center's construction is to improve Honeywell's software-development productivity, which the company sees as key to its long-term business survival.

"We have witnessed tremendous advances in hardware technology by foreign competitors," according to Deward Manzer, vice-president and general manager of

Honeywell's LISD.

"It's the other half of the business — software — where the United States has always outdistanced its international competition, and it's imperative that we maintain our software preeminence. To that end, facilities such as the one we are dedicating today are important and necessary."

But for their productivity to remain high, software developers first require a working environment where outside distractions can be kept to a minimum. "The level of concentration necessary to the program developer is considerable," according to Lee Hazel, manager of Honeywell's advanced facilities planning and programs.

"When one is buried in the labyrinth of program logic, a disturbance not only affects the programmer immediately but in many cases means a retreat and reentry to get back to where you were. This has an obvious productivity impact."

So to minimize distracting noise and give its employees an adequate degree of privacy, Honeywell equipped its software development center with a custom-designed interior, which was designed

with the help of outside consultants representing both the academic and commercial worlds. In its layout, workspace design, furnishings, acoustics and many other physical features, the interior is carefully constructed to promote creativity and thus optimize software-development productivity.

Electronic Mail

As a further aid to programming efficiency, Honeywell equipped the center with state-of-the-art software development tools, including on-line program manuals and electronic workstations supported by a text-processing language. The center also boasts an electronic mail capability that allows software developers here to exchange messages locally and to communicate with their counterparts at Honeywell installations elsewhere in the U.S.

Honeywell's current software development organization traces its roots back to the mid-1950s when it existed as part of General Electric Co.'s computer operations. In 1964, after occupying several locations inside the LISD itself, the organization's headquarters began leading a nomadic existence

that took it to a series of improbable local sites, including a shopping center, department store and paint contracting facility.

"I suppose it was appropriate that our software organization was headquartered in the desert because all our development people were being shifted from place to place like a bunch of Bedouins," according to Richard Douglas, former LISD chief and now vice-president and general manager of Honeywell's International Group. "Meanwhile, our engineers were being pampered."

Two years ago, the software organization moved again, this time to a complex of temporary shelters that still stand in the shadow of the LISD headquarters building. The makeshift facilities proved anything but conducive to technological innovation and high productivity. As many as four software professionals shared a single office. Users outnumbered terminals by three to two, and the general work envi-

ronment was noisy and chaotic.

In the new plant, by contrast, each employee will occupy a separate office or cubicle and the number of users and on-line terminals will exactly balance.

The improvement in the Honeywell software organization's work environment is expected to yield a "substantial" increase in programming productivity, according to Richard Litschgi, the company's vice-president of software development. But the exact extent of the expected productivity gain is reportedly difficult to reckon at this point.

To measure software development productivity accurately, Honeywell has identified a set of some 30 conceptual yardsticks, or "metrics," that include lines of debugged code and the number of user-initiated change reports. Productivity can also be defined as the degree to which a software organization can formulate a development plan and then execute it, Litschgi said.

AEA to Congress on Bill: 'Do Us a Favor . . . Don't'

(Continued from Page 71)

The association said it blames "the impenetrable morass of regulations spawned by more than 80 socioeconomic programs superimposed on top of the procurement 'system'." The AEA listed 81 special interest set-aside programs ranging from preference for U.S. manufactured and transported goods to equal opportunity, nondiscrimination and environmental protection, incorporated into government contracts.

Spawns Abuse

The programs have "spawned a rich literature of abuse, waste, mismanagement and failure" and made it very difficult for government contracting officials to administer federal projects, according to the association. Moreover, Knapp said, small companies do not have the resources to compete for such complicated contracts.

The association described the situation as "the easy habit of passing flashy new programs that make the problem worse as a way of avoiding having to clean out the accumulated debris of the last 30 years."

"Until this proliferation of social legislation on top of the procurement process is pruned back," Knapp said, "it is going to be impossible to lure any significantly large proportion of small

companies into the system."

As an alternative to the innovation bill, Knapp said AEA supports legislation now before Congress that would give new high-technology firms more latitude in taking tax credits for R&D.

Last year's tax bill, the Economic Recovery Act of 1981, does not allow startup companies to carry forward the R&D costs they incur prior to incorporation. Knapp noted proposed legislation would recognize preincorporation R&D costs incurred "in connection with" business instead of those incurred "in carrying on" business as is currently required.

"The key point is that it would leave the critical resource allocation decisions where they belong — in the hands of risk-taking entrepreneurs," Knapp said. He added that "people who are investing their own funds make much better decisions on R&D projects than civil service program managers, no matter how well intentioned."



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SEC Gives Nod To STC's Accounting

LOUISVILLE, Colo. — The Securities and Exchange Commission has approved Storage Technology Corp.'s (STC) accounting treatment of its two research and development limited partnerships, the firm has reported.

This type of partnership has been criticized by the commission in recent weeks because it allows companies to raise funds through separate entities that in turn fund R&D projects. Firms using this method do not have to charge off R&D expenses on current financial statements [CW, Feb. 8].

STC said the commission

found its two partnerships acceptable because it will not necessarily buy out the partnerships, but rather pay royalties to its partnerships only for marketable products developed by the research firms.

Some other firms' sponsoring R&D partnerships intend to buy out those firms at the completion of the development project.

STC has raised \$90 million through two R&D partnerships in the past year to fund the development of a high-end IBM-compatible mainframe and for optical disk development.

DOS Moves to Limit Japanese Chips in U.S.

WASHINGTON, D.C. — The U.S. Department of Defense is reportedly putting pressure on the Reagan administration to consider measures that would limit the imports of Japanese-produced 64K-byte random-access memory (RAM) chips.

Government officials stressed that the move is still in the preliminary stages of

evaluation.

In recent months, Japanese penetration of the U.S. market for 64K-byte RAMs has reportedly reached 70% of U.S. sales of these devices.

By comparison, Japanese chip vendors are estimated to have achieved only 40% penetration of the earlier-generation 16K-byte RAM market.

Contracts & Pacts

Planning Research Corp. has received a one-year, \$4.8-million contract extension to maintain the Military Personnel Records System for the U.S. Navy Military Personnel Command.

Data Management Sys-

tems, Inc. has announced agreements with three European companies to distribute its Datascan software product. The firms are Fipinac Corp. in Paris, and Interscan Communications Ltd. and Ventek, Ltd., both near London.

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Tandem Move Into Terminals Marks Emphasis on Integration

By Robert Batt

CW West Coast Bureau
CUPERTINO, Calif. — Tandem Computers, Inc.'s entry into the terminal manufacturing arena is viewed as an interesting development for a company that until now showed little interest in becoming an integrated manufacturer.

The 6530, multipage display terminal (see story on Page 60), introduced just before the company's recent annual meeting, represents an attempt by the company to integrate those product sectors considered vital if the company is to reach its stated goal of becoming a \$1-billion enterprise by 1985. Revenues last year amounted to \$208 million.

"Our strategy has been that we would only integrate vertically if we could make a contribution in terms of the reliability of our Nonstop systems," Jim Treybig, Tandem's president, told the company's stockholders.

Ergonomic Factors

With the 6530's emphasis on ergonomic factors, Tandem expects the product to open up new market opportunities for the company both in Europe and in the U.S. "Because of its ergonomics, the new terminal will gain for us a significant market share in Europe," Dave Mackie, vice-president of marketing, claimed.

The company has a particular eye on the financial community in marketing its new product. Of Tandem's 506 accounts, only 18% (76 clients) are located in the banking sector. However, they represent a growing part of the business, partly because of the recession in the manufacturing sector of the economy — traditionally a strong market for Tandem.

The company can claim some prestigious customers including the Bank of England (the UK equivalent of the Federal Reserve Board) and the top banks in Holland, Switzerland and France. All told, 25% to 30% of the company's business is conducted outside of the U.S.; mostly in Europe, but also now in Japan where the company claims it has had the best start of any new market it has entered.

Major New Market

The company expects demand for its Nonstop processors by the federal government sector to grow rapidly and sees this as a major new market for its terminal.

The company's objective is to have the Nonstop 11 represent 80% of all new pur-

chases by the fall. A fully integrated terminal made by the firm for use with its own system is seen as a major development in meeting this objective.

The Nonstop 11 is designed to provide a new base of growth for the company in terms of developing new software tools, which will allow users to migrate upwards into larger applications, thereby increasing

demand for its processor.

Protecting the user-base investment in application software is, according to Tandem, the most propitious way to ensure that current growth rates around 90% a year are maintained. However, the company has no plans to get into application software per se; instead, it intends to concentrate on providing the tools for users to develop their own software.

CICS USERS GROUP

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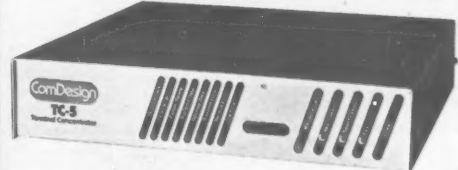
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Zilog Chief Resigns to Form New Venture

CUPERTINO, Calif. — Manny Fernandez, president of Zilog, Inc., is quitting the company after three and a half years to form a new venture in Silicon Valley.

Fernandez's departure, which will take effect next month, completes a trio of resignations from the semiconductor manufacturer in recent weeks. Fernandez will join Wayne Sennett, Zilog's former vice-president of strategic planning, and John Banning, a former Zilog engineer, to form Cosmos Computer Corp.

Fernandez said the new

company will manufacture sophisticated microcomputer systems at the high end of

the price range, but he declined to say what applications would run on the machines. The first shipments are expected to take place in about 15 months.

Despite rumors that Fernandez had quarreled with Exxon Corp. — Zilog's parent company — about future business strategy, he stressed

the major reason for his decision to resign was in order to found Cosmos. The new

company would not compete "in any way, shape or form" with Zilog systems or components, he said.

Like many of Silicon Valley's chip manufacturers, Zilog has been going through a tough time recently as the recession continues to impact the industry. The firm reported an estimated \$10 million to \$12 million loss last year because of large investments in new microprocessor and computer systems products.

While Fernandez is believed to favor following Intel Corp. and Motorola, Inc. into the systems field, Exxon chiefs are thought to want the company to remain mainly a components manufacturer.

Exxon has not named a date for appointing Fernandez's successor. Likely candidates for the job are believed to be Ben Bonderschmidt, general manager of Components Division; Rolando Estevearena, vice-president of the Systems Division; and Ken Moore, vice-president of finance.

Other Moves

• Ronald V. Hill will become president and chief executive officer and a member of the board of directors at Omex.

• Seaforth M. Lyle has been named president and chief executive officer at Computer Devices, Inc.

• Jay Rodney Reese has resigned as president and chief executive officer at Recognition Equipment, Inc., and has been succeeded in both capacities by John Lawrence, who will also continue as chairman of the board of directors.

• Dean Phypers, IBM senior vice-president, has been elected to the board of directors and has been named to the corporate office and corporate management committee at IBM.

• Peter Boni has been appointed president and chief executive officer at Summa Four, Inc.

• Ramtek Corp. has named two new vice-presidents, promoting Wilbur Sattler to vice-president of operations and G. William Thieriault to vice-president and controller.

• Robert Schmonsees has been promoted to vice-president of sales and services at STSC, Inc.

• Wayne Jobe has been named vice-president of marketing for Execucum Systems Corp.

• Robert Weiler has been appointed vice-president for the McCormack & Dodge Corp., and Steven Weinberg has been appointed vice-president of sales at that company.

• Paul Van Middlesworth has joined Megatek Corp. as vice-president of manufacturing.

• John K. Sheehan has been appointed to the newly created position of vice-president of consulting services at SMC Proprietary Systems, a subsidiary of Science Management Corp.

• Two new vice-presidents at PHD Systems, Inc. are John Berrigan in sales and Richard F. Walsh in management and planning.

• Dr. Gad Selig has joined Contel Information Systems, Consulting and Technical Services Division, as director of technology and strategy.

• Harry L. Thurmon has been named corporate vice-president for new business development at E-Systems, Inc.

• Zentec Corp. has appointed Douglas Hayward to the position of vice-president, personnel.

• James Allen has been named vice-president of sales at Philips Information

Systems, Inc.

• Televideo Systems, Inc. has named Charles Kempton and Alan Platt to two newly created vice-presidential spots in charge of marketing and international sales, respectively, in the company's Computer Systems Division.

• Wolfgang Kayser has been named vice-president of engineering at Three Phoenix Co.

• Harry Hearn has been appointed vice-president and general manager of European sales and services at General Electric Information Services Co.

• Max Thayer has been promoted to executive vice-president at Information Industries, Inc.

• Texas Instruments, Inc. has named Kirk Pond as assistant vice-president.

• John T. Maske has been named to the newly created position of corporate vice-president at Prime Computer, Inc.

• Mark Franzen has been named vice-president of finance and administration at Micro Peripherals, Inc.

• Robert A. Heckman has joined Affiliated Computer Systems as senior vice-president of marketing.

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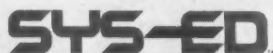
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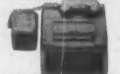
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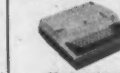
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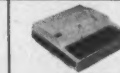
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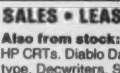
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COMPUTERWORLD

Create, Then Sell Own Packages Users Step in to Fill Industry-Specific Gaps

By Bob Johnson

CW New York Bureau

NEW YORK — American businesses, dissatisfied with the software and systems available for their particular industries, are flexing some entrepreneurial muscle and becoming DP producers themselves.

Computer tools are emerging from user sites across the country, sparked by complaints about inadequate existing software, unequipped service bureaus and high costs.

Weaned on consultants and service bureaus, these users decided to create packages and systems that meet their specific needs. Some are even creating DP subsidiaries and marketing their products to other businesses in their industries.

Fashion Minis

One such company is El-Jay Jrs., Inc., a \$55-million per year dressmaker in New York's fashion center, the city's single largest industry. A former service bureau user, El-Jay saw the application possibilities for its business with the advent of the minicomputer and chose to have software created for its particular needs and requirements. El-Jay President Lee Blumenthal said he wanted to sit at his desk and be able to control his company.

That reason, coupled with a dissatisfaction with existing software, spurred Blumenthal to have an apparel industry package produced. With the help of Mel Mintz, then a service bureau owner, the package was created. According to Blumenthal, it was so good that IBM offered to buy it from him. "At that time I knew I had a good thing," he said.

As a result of the package's success, El-Jay formed Apro Systems, Inc., a subsidiary of the company headed by Mintz. The company is responsible for creating software packages and systems for the fashion business and with marketing its original package. The system uses an

IBM System/34 minicomputer and, according to Mintz, "concentrates on the nuts and bolts of the apparel industry."

Mintz claimed that because he knows the apparel business so well, designing software for it comes naturally. He added, however, that the apparel business is a business run by exceptions, not by

rules, and the programming for it has to be custom-made.

"Because we know the ins and outs of the business, we were able to design an applications package to suit our industry's needs," he said.

Apro currently has 22 clients using its system, including Kaiser-Roth Co., which produces the Oscar de la Renta line of clothes. El-Jay's

own installation ties the company's network of 23 CRT terminals to its warehouse and showrooms.

Other Innovators

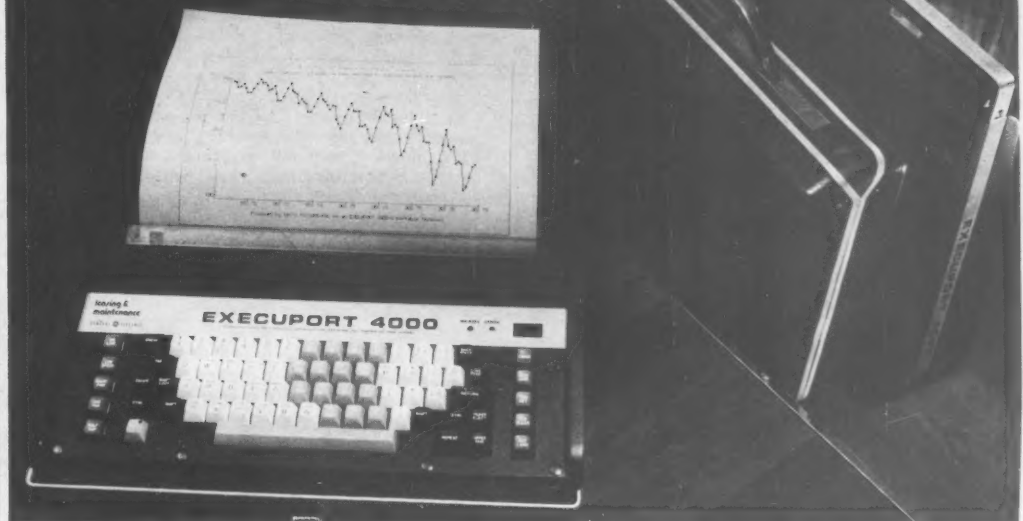
Far removed from the fashion industry but no less innovative is Mathews Co., an Illinois-based farming equipment manufacturer. A few years back, B.C. Mathews,

the company's 70-year-old founder, decided that he wanted computerized control over the manufacturing process.

Arthur Young & Co., a N.Y. accounting firm, was hired to find a suitable package for the company, but could not, according to John A. Heisler, manager of the company's

(Continued on Page 78)

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GENERAL ELECTRIC

Users Step in to Fill Industry-Tied DP Gap

(Continued from Page 77)
M-C Data Services division.

"We looked around and everything available was either unrelated or too general, as IBM's package," Heisler said.

Necessity dictated that Mathews Co. develop a system of its own and, according to Heisler, after several thousand man-hours and several hundreds of thousands of dollars, the M-C

manufacturing system was born.

The system, now marketed by the M-C Data Services division, consists of 65 integrated programs, reports and files, including source documentation and operating manuals. The package is unique, Heisler said, because it is written in Ansi 74 Cobol and is universally acceptable to those in the manufactur-

ing environment.

According to William J. Jelinek, president of Mathews Co., the company's decision to create its own software was on target. "The company has never been more organized in the 27 years of its existence."

About two and a half years ago, Industry Media, Inc., a magazine publishing house in Colorado, looked at its computer use costs from service bureaus and determined they were too high. The company's DP manager, Lee

Pierce, said that with a little analysis the company found it could do just about everything it needed in terms of DP with a minicomputer system of its own, for just about the same amount of money. Pierce said that in less than nine months all of the system's subsystems were written and successfully tested.

With the system up and running for over a year and a half, and its reputation spreading across the publishing industry, Pierce said that other publishers are now

showing interest in acquiring the company's software package. At trade shows and through direct mail contracts, Industry Media has now begun to offer the fruits of its labor to others in the publishing industry.

Pierce agreed that because of the lower cost of hardware today and the availability of DPs with various experience in many aspects of industry, businesses will continue to seek computer assistance internally, or from within their own industries.

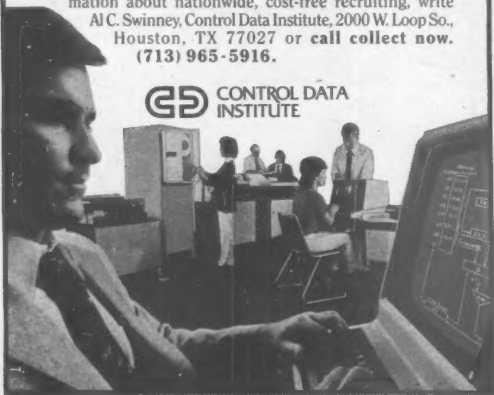
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Fed Brief Backs Citicorp Services

(Continued from Page 71)

Adapso attorney Milton R. Wessel said at the Feb. 5 hearing that although "there is little hard evidence of outright violations of law" by Citicorp, the potential for unfair marketing tactics "is at least implicit in the [Citishare] proposal."

Summarizing Adapso's contentions in the proceeding, Wessel argued for a "very restrictive" interpretation of the banking regulation so that banks could not unfairly compete with DP services firms that do not have the size and resources of large national banks.

Citicorp counsel Richard A. Whiting, however, responded by calling Adapso's position a "really remarkable and... convoluted reading" of the regulation. He claimed the regulation has traditionally been used by the Fed to interpret banking laws in

light of changing industry conditions.

He termed Adapso's concerns about cross-subsidies and tying "fanciful" and said "charges of unfair competition are unsupported."

Arguing forcefully against what he called "broad, crippling prohibitions" being sought by Adapso, Whiting said, "I find it ironic and disturbing that an industry, the computer services industry, that has been so known for innovation, dynamism and progress should become so paranoid" about possible competition from bank holding companies.

Whiting's assertions were supported by the Fed attorneys, whose brief recommended a whole range of sophisticated services including electronic funds transfer, home banking and time-sharing services for financial and economic data, be declared permissible under current law.

"The record demonstrates

that Citicorp's proposal is closely related to traditional banking," Howard said. He added that all the Citishare proposals could be easily prevented from including illegal cross-subsidies or tying. "The record fully supports the adoption of the proposed [regulation clarification]," according to Howard.

There is "only one significant issue" in the proceeding, he said: "how the board should react to new technology to perform the financial data processing currently authorized."

Presiding Federal Administrative Law Judge Walter J. Alprin said that given the complexity of the issue and the volume of the written record he could not predict how long it would take him to produce his recommended decision in the dispute. But according to standard procedures, the Fed should receive his findings within two months.

Contracts & Pacts

Burroughs Corp. has signed a \$1.5-million contract with Spectrum Training Corp. for development of a new package of computer training and installation aids.

Dataroyal, Inc. has announced an OEM agreement with Rexon Business Machines Corp. for Dataroyal's IPS-5000 matrix printers. Terms of the contract were not disclosed.



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GE Now Owns 100% of Geisco

ROCKVILLE, Md. — General Electric Co. has purchased for about \$70 million the minority interest that Honeywell, Inc. held in General Electric Information Services Co. (Geisco).

The transaction gives GE 100% ownership of its Geisco computer services subsidiary.

Honeywell previously held a 15.9% ownership in Geisco. That minority interest was obtained in 1979 when Geisco was formed as a joint venture between Honeywell and GE.

The venture combined the European and Australian computer services marketing and distribution organizations of Honeywell with the computing services business of GE.

DEC, Auto-Trol Join In CAD/CAM Plan

MAYNARD, Mass. — Digital Equipment Corp. has signed a cooperative marketing agreement with Auto-Trol Technology Corp. of Denver for the sale of its interactive computer systems for use in computer-aided design and manufacturing applications (CAD/CAM).

Under the arrangement, DEC and Auto-Trol marketers will make joint sales calls and cooperate in systems configuration.

Auto-Trol's CAD/CAM systems were designed to run on DEC's VAX-11/780 and VAX-11/750 systems, the vendor said.

IBM has closed its branch office in Iran and the Iranian government has bought the office's rental equipment, parts and supplies for an undisclosed amount. In addition, the firm also announced its retreat from the video-disk market by turning over its jointly held 50% interest in Universal Pioneer Corp. to Pioneer Electronic Corp. of Japan.

Integrated Circuit Engineering Corp. has announced the formation of Torric Corp. as a subsidiary that will develop new structured design techniques and support computer-aided design tools.

Digital Pathways, Inc. has sold its memory products line to The Bedford Group of Bedford, Mass.

Gerber Systems Technology, Inc. has formed a corporate structure for doing business in Europe. Two wholly owned subsidiaries, Gerber Systems Technology International, Inc. and Gerber Systems Technology GmbH, have been established.

Ardent Key Tech Corp. has acquired certain Datanetics keyboard product lines.

The Electronics Marketing Group of Wyle Laboratories admitted that National Semiconductor Corp. was canceling Wyle franchises in California for Santa Clara, El Segundo, Irvine and San Diego, as well as in Seattle.

Supershorts

Personal Software, Inc. in San Jose, Calif. has officially changed its name to Visi Corp.

Modular Computer Systems, Inc. has formed a Federal Systems Division in Fort Lauderdale, Fla., to support pre- and postsales on a nationwide basis.

Beehive International, Inc. intends to market a CP/M-based communicating desktop intelligent terminal

to users of IBM and other mainframes.

Ramtek Corp. has established a division to develop custom systems based on its own color graphics equipment in Napa, Calif.

IBIS Systems, Inc. has formed a division in Boulder, Colo., to design controllers for high-capacity disk memories.

Nickels & Dimes

Communications Satellite Corp. (Comsat) has reached an agreement with four banks on the establishment of a \$30-million line of credit to be used for working capital.

\$\$\$

CGA Computer Associates, Inc. an-

nounced that the Securities and Exchange Commission has approved an offer of settlement by the company and will terminate proceedings against the company subject to satisfaction of certain conditions.

\$\$\$

Itel Corp. has reached a tentative agreement with its unsecured creditors on the "major elements" of a proposed plan of reorganization that it hopes to complete later this year. The unsecured portion of Itel's \$1.3 billion in debt is about \$900 million.

New Companies

Monday Night Software is a new company founded by former NFL quarterback Virg Carter. The firm develops packaged programs for the IBM System/34 user and is based at Suite 301, 535 N. Brand Blvd., Glendale, Calif. 91203.

A new telecommunications company, Optimum Communication, Inc., began operations recently with the development of its first product, a telephone cost management system for small businesses. The address of the company is 800 Charcot Ave., San Jose, Calif. 95131.

Synergistic Systems, Inc., a new computer consulting firm, has been established at Suite 815, 465 California St., San Francisco, Calif. 94104.

Microbase Software, Inc. has been formed to help small businesses through the process of office automation. It can be reached through P.O. Box 40353, Indianapolis, Ind. 46240.

Applied Computer Graphics, a firm specializing in computer graphics consulting, has been formed at Suite 101, 9720 Town Park, Houston, Texas 77036.

Expansions

Versatec, Inc. has added a fourth building to its Santa Clara, Calif. complex. The new 110,000 sq-ft facility represents a 45% increase in manufacturing and warehouse space.

Litton Computer Services Division of Litton Industries, Inc. has broken ground on a new building in Reston, Va., that will more than double the size of its headquarters.

Scientific Systems Services, Inc. will begin construction on a new corporate headquarters in late March. The eventual 25,000 sq-ft building will be located in Melbourne, Fla.

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More Flexibility for End Users

Semiconductor Tech Seen Charging Up in '80s

By Robert Batt

CW West Coast Bureau

PHOENIX — Developments in semiconductor technology in the 1980s will result in more flexible applications for end users, technical experts at Motorola, Inc. claimed here recently.

Dennis Pfleger, strategic marketing manager for microprocessor and software products at the company's Semiconductor Products Division, said current practice with gate array technology is the forerunner of even more sophisticated devices.

The time is not very far away when manufacturers will be able to put the computing power of an IBM 370/168

on a piece of silicon. "The key question is, what do users want to do with that technological capability?" Pfleger pointed out.

Pfleger said this computing power would pose problems for users, many of whom did not yet even know how to use single-chip micro control units. According to Pfleger and Ralph Greenburg, Motorola consultant for strategic marketing, by 1985 the state of the art would be such that instruction sets would be capable of meeting individual customer applications. "They will look very much like what the customer wants them to look like," Pfleger said. "For example, if a user in the automotive in-

dustrial wants to select an instruction for a sensor in an engine, he will be able to do it. Again, users in the telecommunications industry will have instruction sets capable of telling them which nodes are active at any one time."

At the same time, the specialists rejected the view recently put forward by Japanese experts that the next generation of computers — the so-called fifth generation — should entail a radical departure from Von Neumann architecture, on which the world's computer systems have been based for the past 30 years.

This view was the subject of a special study commissioned by the Japa-

nese Ministry for International Trade and Industry last year and attracted widespread interest from manufacturers in the U.S. and Europe.

"We are looking at new architectures, but we still want to produce [migration] ability for the user. We don't believe you can go too far away from current structures. The processor of the mid-1980s will still be recognizable although dramatically different from the CPU of the mid-1970s," Pfleger added.

The new technology identified by Motorola as the key to future developments of its products is called sub-micron technology. As with gate arrays, it is, Greenburg said, a way of providing a unique product and yet still being familiar to the user. Sub-micron technology was designed to allow tighter compression and packaging of components onto a chip enabling the vendor to change the microcode or instruction set in a way that cannot yet be done.

The idea is to provide the ability to put much more circuitry on a piece of silicon, which in turn allows for an increased permeation of the microcode. "There is a top-level commitment by Motorola to compete with the Japanese and we are putting a significant amount of money into looking at what we need in the 1990s," Greenburg said.

"I personally do not believe we will ever sell into the Japanese market in large quantities. The real threat posed by the Japanese is if they start making their computers better. That would lessen the market we serve," he added.

A recent report by Hewlett-Packard Co. claimed U.S. semiconductor manufacturers were catching up with their Japanese counterparts in producing the best quality devices, although Japan still produced the best quality chip.

No. 1 Supplier

Recent sales figures indicate that Motorola has overtaken Texas Instruments, Inc. as the No. 1 supplier of semiconductor devices in the U.S., although TI is still acknowledged as being the largest manufacturer worldwide. Recently, Motorola stated its intention to broaden its product base into the mainstream computing field through the acquisition of Four Phase, Inc. Although the company would not comment on its intended moves, it is believed the acquisition would give it greater leverage in competing in growing markets such as office automation.

Meanwhile, Hunter and Ready, Inc., a Palo Alto, Calif.-based microprocessor software vendor, has announced two additions to its VRTX family of silicon software components that it claimed will dramatically lower the cost of applying 16-bit chip technology for industry, science, medicine and telecommunications.

The VRTX/68000 and the VRTX/86 were designed to extend and simplify system programming of the 68000 processor by providing a set of instructions that control multiple real-time tasks in response to asynchronous events and inputs.

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Miami	\$724.00	\$340.00	\$459.50	\$487.00	\$373.00
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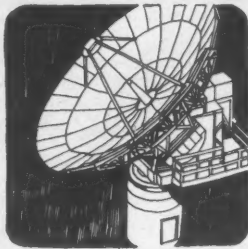
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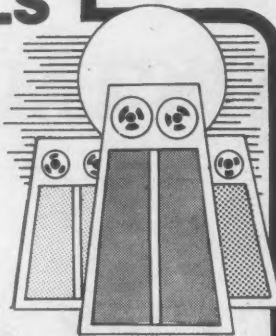
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Use the latest concepts and techniques in software and systems evaluation to conduct product specification and product quality assurance. Accountabilities include product reviews, test definition and development, and systems analysis. Assignment involves interactive business systems and software. BSCS plus 2 years experience in systems analysis and/or applications programming are required.

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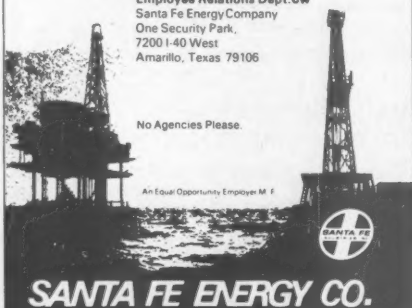
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Required is an associate degree and at least 5 years' experience in data processing.

Data Base Analysts and Support Analysts

You must have a minimum of 2 years' experience in IMS system support including use of BTS, IMS utilities, DB performance and tuning tools—IMSPARS, IMSASAP, DB and DC monitors, etc.

Commercial Programmers

Your primary duties will include development and maintenance of software to support purchasing, shipping and financial activities of the company.

Required is 2 years of DP experience; PLI, OS/MVS, JES2, structured techniques experience; and experience with projects involving treasury, industrial relations, and payroll.

We also need Commercial Programmers with 3 years' experience and familiarity with PLI, TOS, IMS, DB/DC, OS utilities, and MARK IV/SAS.

Commercial Analyst/Programmers

You must have at least 3 years' experience in design, analysis and programming of commercial application systems, and at least 2 years' experience in IMS on-line DB/DC and PLI. ADF or MARK IV experience is required as well.

Standards and Procedures Analyst

You must have at least 3 years' experience in data processing including systems analysis and technical writing. Experience with IBM TSO/SPF and SCRIPT/VS is necessary. Candidate will conduct search and analysis to insure quality and consistency of documentation and assist project teams in developing standard procedures and guidelines. Individual may also interface with user groups in a quality assurance role.

Accounting Staff Analyst

A systems analyst is needed with 4 years' experience in data processing, of which 2 years should be in a staff function. Candidate will prepare business plans, budgets, and monthly accruals. Vendor interface and cost justification of hardware will be a large part of the job.

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Required is a BS degree (4 years' experience may be substituted in lieu of a degree) plus 7 years' experience in EDP. A thorough knowledge of IBM JCL, TSO and OS/MVS JES2 is required. A strong knowledge of procedures analysis, systems analysis, computer operations and standards (as they apply to acceptance of new applications) will be necessary. Candidate will be required to supervise 10-25 people during 2nd & 3rd shifts in resolving job failure problems and scheduling functions.

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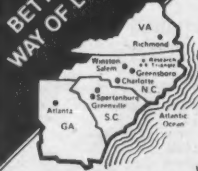
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The selected individual will act as a major contributor to systems design, programming, testing and debugging. Will also interface with User Department personnel to analyze system requirements for small and medium sized systems or modifications/enhancements to current systems, and formulate optional solutions. Should have a solid knowledge of data processing including a minimum of 2-3 years programming experience in an on-line environment. Good written and oral communication skills are essential; college degree or equivalent experience is required.

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
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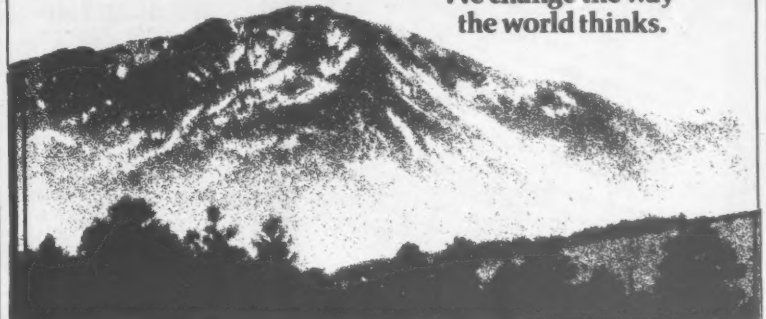
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SALARY: Commensurate with qualifications and experience.
INSTITUTION AND LOCATION: Illinois Natural History Survey, Champaign, Illinois. The Illinois Natural History Survey is located on the campus of the University of Illinois and is a division of the Department of Energy and Natural Resources, State of Illinois.
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Applicants should send a letter of application and a resume, including names and addresses of 4 references to:

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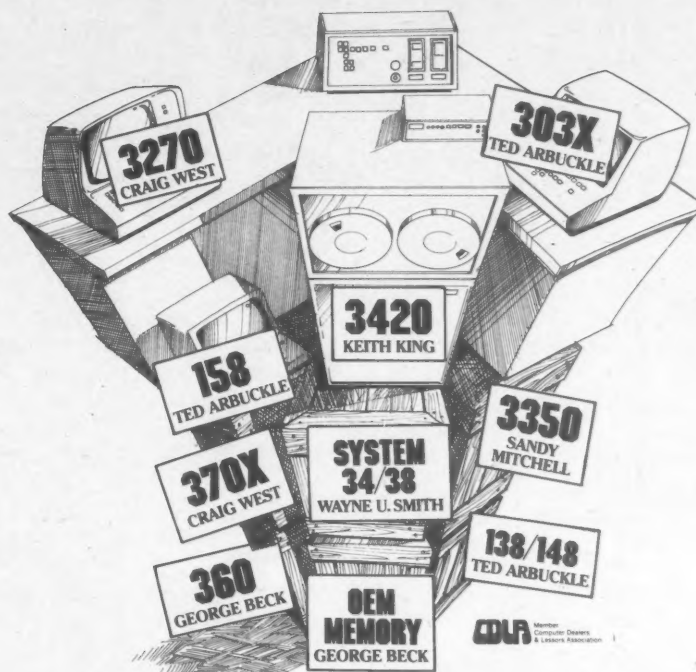
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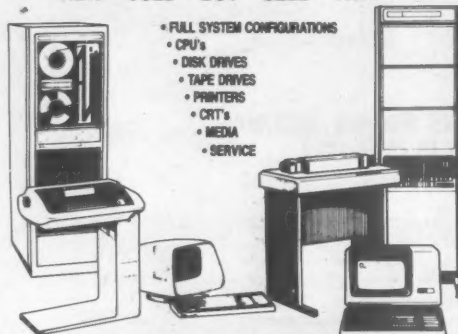
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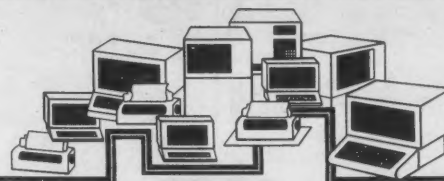
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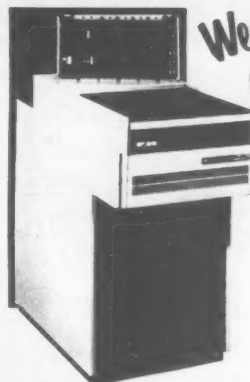
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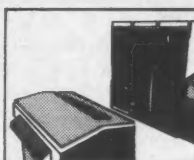


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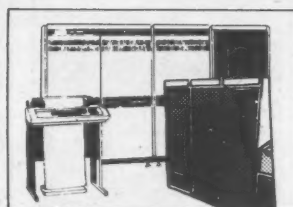
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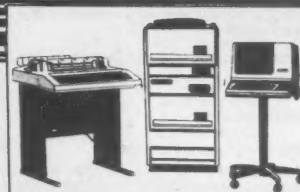
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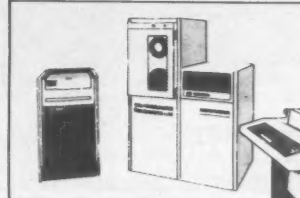
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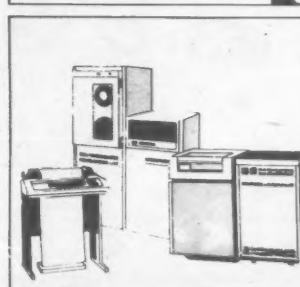
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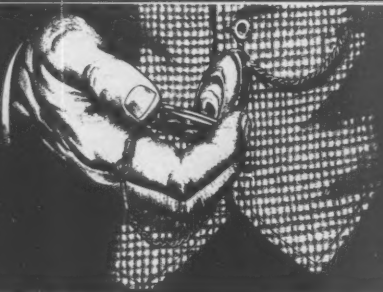
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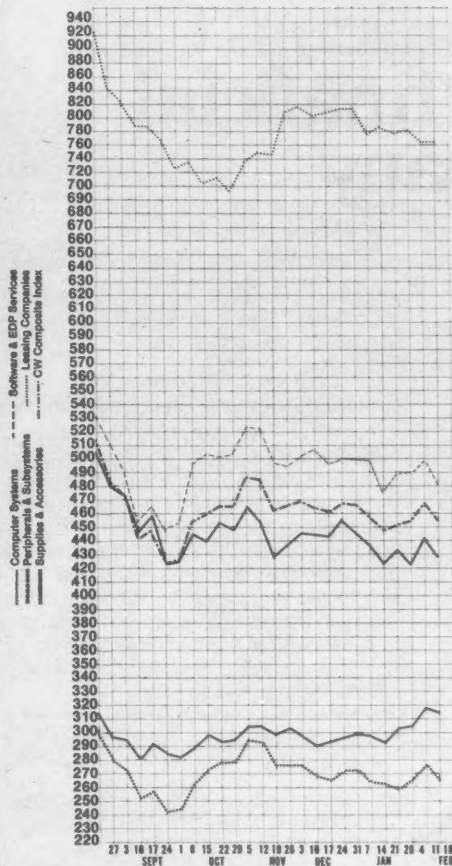
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All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES WEDNESDAY, FEBRUARY 10, 1982

E X C H	1981-82 RANGE (1)	CLOSE FEB 10 1982	PRICE NET CHG	WEEK PCT CHG	E X C H	1981-82 RANGE (1)	CLOSE FEB 10 1982	PRICE NET CHG	WEEK PCT CHG	F X C H	1981-82 RANGE (1)	CLOSE FEB 10 1982	PRICE NET CHG	WEEK PCT CHG	
COMPUTER SYSTEMS					SOFTWARE & EDP SERVICES					SUPPLIES & ACCESSORIES					
A ANDAHL CORP	23-48	28 1/4	-1/4	-0.9	O ADVANCED COMP TECH	2-8	2 1/4	-1/4	-10.0	A COMPUTER CONSOLES	19-28	19	-1 1/4	-8.1	
N AIRBORNE CORP	28-72	34	+1 1/4	+3.8	O ADVANCED SYSTEMS INC	10-15	13 1/2	0	0.0	O COMPUTER TRANSFIVER	3-8	8 1/4	0	0.0	
O COMPUTER AUTOMATION	8-28	12 1/2	+1/4	+2.0	O ANACORP INC	10-18	10 1/2	+1/4	+2.4	N COMPUTERVISION CORP	20-48	30 3/8	-2 1/4	-6.8	
N CONTRIN DATA CORP	18-42	33 5/8	-1	-2.8	O ANALYSTS INTL CORP	3-14	7	-1/2	-8.8	N CONRAD CORP	17-28	22 3/4	-1/2	-2.1	
N CRAY RESEARCH INC	28-48	33 1/2	-1 1/4	-3.5	A APPLIED DATA RES.	13-25	20 3/4	-1 7/8	-8.2	A DATA ACCESS SYSTEMS	2-23	2 7/8	-1/2	-14.8	
N DATA GENERAL CORP	42-87	51	-2 1/8	-4.0	B ASTRADYNE CORP INC	3-5	3 1/4	-7/8	-21.2	A DATA/PRODUCTS CORP	18-44	10	-1 3/8	-8.2	
N DATAPoint CORP	32-68	31 1/2	-4 3/4	-13.1	N AUTOMATIC DATA PROC	22-32	25	-3/8	-2.4	O DATUM INC	2-5	5 1/8	-1/8	-7.1	
N DIGITAL EQUIPMENT	80-113	85 3/8	-1 1/2	-1.7	O CCA COMPUTER ASSOC	4-25	5	-1	-16.8	O DAVID JAMESON CARL YI	3-7	6 3/4	+3/8	+0.2	
A EECO INC	7-10	7 1/2	-7/8	-10.4	O COMPUTER HORIZONS	1-5	3	-1/4	-7.6	O DECISION DATA COMPUT	3-6	3	-7/8	-22.5	
N ELECTRONIC ASSOC.	5-13	7 7/8	-1/8	-1.5	O COMPUTER NETWORK	4-8	4 3/8	-1/2	-10.2	O DELTA DATA SYSTEMS	2-4	1 7/8	0	0.0	
N FOUR-PHASE SYSTEMS	18-48	38 1/4	-1 1/2	-3.7	N COMPUTEX SCIENCES	12-38	13 1/4	-1	-7.0	O DATARAM CORP	4-15	6 1/2	-1/8	-1.8	
N FOURMOR	42-82	48 3/8	-2 1/8	-4.2	O COMPUTER TASK GROUP	10-23	9 3/4	-1/2	-4.8	N ELECTRONIC H & H	3-9	3 1/2	0	0.0	
O FULCRUM CORP GRP	1-3	3/8	0	0.0	O COMPUTER URAFG	2-10	3 1/2	+1/8	+3.7	O EVANS & BUTHERLAND	18-40	23 1/4	-2 1/4	-9.8	
O GENERAL AUTOMATION	6-18	5 7/8	-1/4	-4.0	O CONSERV CORP	9-18	13	-3/4	-5.4	O FABRI-TEK	2-6	5 7/8	0	0.0	
N HARRIS CORP	31-60	33 7/8	+1/8	+0.3	O COSHARE	7-21	7 1/4	0	0.0	O GENERAL COMPUTER SYS	1-12	5 1/2	-1	-15.3	
N HEMLETT-PACKARD CO	33-54	41 1/4	-2 1/8	-4.8	O CULLINAN DATABASE	15-37	30 1/4	-2	-6.2	N GEN'L DATA COMM IND	8-19	6 1/4	-1/4	-2.8	
N HONEYWELL INC	63-113	72 1/8	-3/8	-0.5	O DATA DIMENSIONS INC	0-4	3/8	0	0.0	O GENERAL TERMINAL CP	1-4	5/8	0	0.0	
N IBM	48-73	61 7/8	-7/8	-1.3	O DATASAB	1-4	4	1 3/4	0	0.0	N HAZELTINE CORP	19-35	28	-3/4	-2.5
O RADSONIC CORP SYSTR	4-32	4 7/8	-1/8	-2.3	O DSI CORP	4-8	5 1/4	+3/8	+7.8	O INFORMATION INTL INC	8-17	12 3/4	+1	+8.5	
N MANAGEMENT ASSIST	9-26	10 3/8	0	0.0	O DYATRON CORP	3-11	3 3/8	0	0.0						
O MINI-COMPUTER SYST	1-8	3/4	0	0.0	N ELECTRONIC DATA SYST	15-30	21	-1	-4.5	O INTEL CORP	21-51	24 1/2	-3/4	-2.8	
N MODULAR COMPUTER SYS	7-32	7 1/4	0	0.0	O INFORMATICS INC	10-23	18 1/2	-1/2	-2.9	O IPL SYSTRS INC	6-15	7 3/8	-1/8	-1.8	
N MODARK DATA SCI	11-32	12 1/8	-1 3/4	-12.5	O INSYFT CORP	1-3	2	0	0.0	A LUNDY ELECTRONICS	7-18	9 3/4	+1/4	+2.8	
N NCR	38-78	43 1/8	+1/4	+0.5	O IPS COMPUTER MARKET	1-4	1	-1/8	-11.1	A NBI DATA CORP	11-27	16	-3/4	-4.4	
N PRIME-COMPUTER INC	18-48	21 7/8	-2 3/8	-8.7	O KRAM ASSOCIATES	4-8	4 1/4	0	0.0	O NETWORK SYSTEMS CORP	14-25	17	-2 1/2	-12.8	
N PERKIN-ELMER	21-38	25	-1 5/8	-8.1	A LORICOR	23-38	31 3/4	+3/8	+1.1	N PARSYNE CORP	23-32	37 5/8	-3 3/8	-8.2	
N SPERRY CORP	30-65	31 1/2	-7/8	-2.7	O MNET SCI ANFR INC	17-28	18 1/4	-2 1/2	-11.4	A PENNILL CORP	8-17	8 1/2	+1/8	+1.4	
N TANDEN COMPUTERS INC	13-35	25	-2	-7.4	O MATHEMATICAL INC	12-28	25	-1/2	-1.8	O RANTEX CORP	8-23	15	+1 1/4	+8.0	
N TEXAS INSTRUMENTS	71-151	95	-1/8	-0.1	O MATHEMATICAL APP GRP	15-28	18 1/2	+10.7	+18.7	N RECONITION EQUIP	3-21	4 1/2	-1/8	-2.7	
A WANG LABS.	23-48	28 1/4	-1 3/8	-4.4	O NATIONAL DATA CORP	14-28	17 7/8	-1 1/4	-8.5	O SCAN DATA	1-5	3/4	0	0.0	
					N PLANNING RESEARCH	5-13	7 1/8	+1/8	+1.7	N STORAGE TECHNOLOGY	18-40	32	+1 1/2	+4.8	
					O PROGRAMMING & SYS	1-2	1	-1/8	-11.1	O SYRIS DATA/TECH	8-34	25	-1 1/2	-5.8	
					O REYNOLDS & REYNOLD	6-26	18 3/4	-1/4	-1.3	A T BAR INC	12-18	14 3/4	-3/8	-4.0	
					O SET CORP	17-28	25	0	0.0	O TEC INC	4-7	8 1/2	0	0.0	
					O STBC INC	8-28	7	-1/4	-3.4	N TEKTRONIX INC	48-70	40 1/2	-1 1/4	-2.5	
					O SCIENTIFIC COMPUTERS	7-18	7 3/8	-3/8	-4.8	N TIFX	3-9	7 1/2	-1/2	-6.2	
					O SOFTWARE AG	8-23	8 1/4	-1/4	-2.8	O TESDATA SYSTEMS CP	8-17	8 3/4	-1/8	-1.8	
					N TYNSHAF INC	18-38	18 1/4	+1/2	+2.6	A TIMEPLEX INC	7-18	7 3/8	-3/8	-4.8	
					A URS CORP	11-18	12 1/4	-5/8	-4.8	O WILTEK INC	1-3	1 7/8	-1/8	-6.2	
					N WYLY CORP	7-20	7 1/2	-5/8	-7.8						
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